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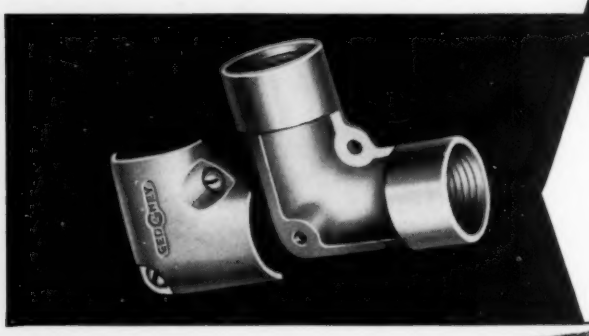

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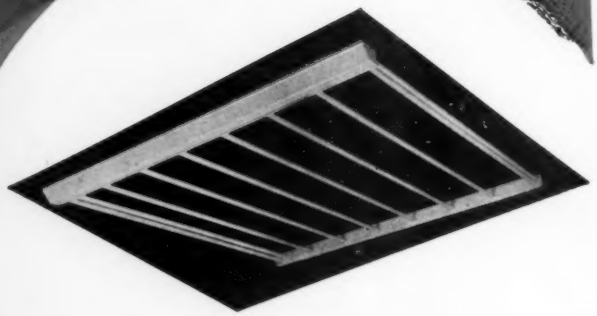

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Economic comment

by J. Whitney Bunting, Ph.D.

Contributing Economics Editor

New products significant

One of the least understood and recognized benefits of the American free enterprise economic system is the vast flow of new products that continually passes in review before the consumer.

In no other economic system is it possible to introduce and produce such a wide variety of new items, the life of which upon the public market is determined by the ability of the product to satisfy the needs and desires of the consumers. This very fact has allowed the national standard of living to rise to unprecedented heights and to make the American people the best fed, best clothed, best housed, etc., of all the peoples of the world.

One is apt to think of new products purely in the consumption sense. However, there are myriads of ways by which society benefits from the flow of new goods on the market. Of course, a new product or technique will, if publicly accepted, create new businesses or industries which in turn create new jobs for the constantly increasing population. Quite frequently, these new jobs produce very favorable salaries for the employees and as a result, tend to further accentuate the prosperity and standard of living of the people.

New income such as this increases the amount of tax receipts by all governments, thus allowing either greater governmental service to the people or perhaps a reduction in the per capita tax rates. The latter, unfortunately, is the less frequent benefit of the two.

Dr. Bunting is a well-known economist and educator having special knowledge of the South.

But above these benefits which accrue to all, new products can often spell economic salvation to specific localities or regions. Of course, this depends in large part upon the willingness of the community to take certain steps to attract these new producers or industries into their locality.

Regional economic health

Economic history in the United States is filled with cases of communities, suffering severe industrial and unemployment hardships because of lost economic resources, that have returned to business prominence by virtue of their wisdom in encouraging new production facilities.

Other communities with surplus labor supply have found that the attraction of new business can keep workers of good quality enthusiastic in the opportunity for self-advancement at home without the need for migrating to new cities or regions in a search for better jobs.

Effect upon the South

It is also apparent by viewing the economic growth and development of the South in recent years, that the industrial and business expansion that has taken place has not been occasioned alone by the transfer of old production facilities into the Southern states. Certainly there has been some of this, but by and large, the great development has been in industries producing new products.

Many of these products were not in existence even ten years ago, a short period of time in economic history. Since their inception in fine new industrial plants with a willing and eager labor force, they have been able to build and make secure markets in all sections of the nation. Thus, the South has progressed into an economic position no longer dependent upon the whims of an agricultural economy. This has been an important factor to the well-being of citizens throughout the nation.

One further fact in this relationship of new products to the economic health of a community. Many localities and regions have learned to their deep regret that dependency upon one industry is rather precarious to the health of the community. As in the field of investments, the greatest degree of safety in economic storms lies in the practice of diversification.

Industrial diversification

Every local Chamber of Commerce should strive, as a part of its civic duty, to promote a well-balanced business picture to the end that citizens will not be too adversely affected by setbacks localized in one particular type of industry. Such a practice can minimize the ill effects of business cutbacks that, under a single industry-community situation, might well cause a prolonged period of hardship.

The alert business association can do a great economic service to the people of its community by constantly reviewing potential new industries (and new products) with a view toward developing greater diversification of local economic life. Along with this must be an awareness of the need for a ready amount of "risk capital" that will be willing to invest in a new undertaking where the benefits appear to be great. Such a program can insure the health of a community and make it a better place in which to be in business.

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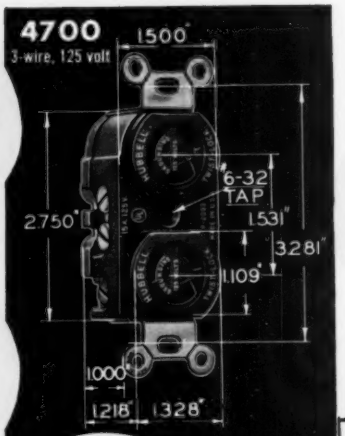

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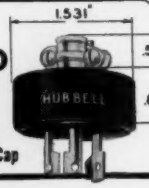

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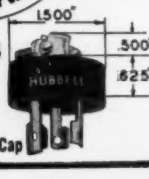

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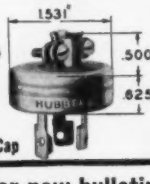

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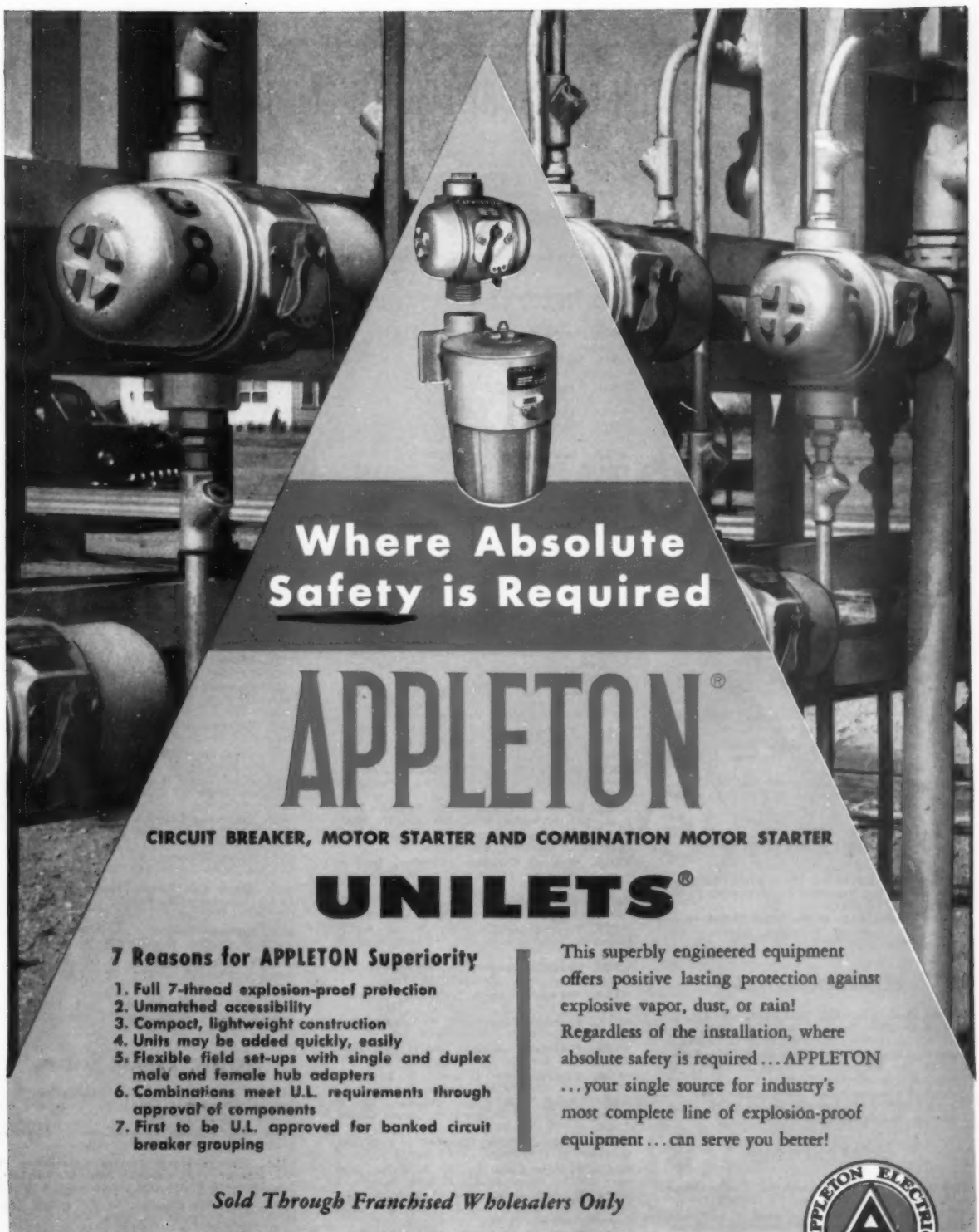

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MOTOR REPAIR SHOPS

National Industrial Service Association, Inc. Fred B. Wipperman, Executive Secretary, 818 Olive St., St. Louis 1, Mo.

NISA, Southeastern Chapter. M. E. Assalone, Secretary, 235 NW 2nd Ave., Miami 36, Fla.

NISA, Electric Motor Service Association of the District of Columbia. John W. Lainhart, Secretary, 913 E. St., NW, Washington 4, D. C.

NISA, Louisville Chapter. W. C. Krauth, Secretary, 118 S. 1st St. Louisville, Ky.

NISA, New Orleans Chapter. William Dreis, Secretary, 1517 Calliope St., New Orleans, La.

NISA, Mid-South Chapter. Murphy G. Miller, Secretary, 109 Jennings Ave., Knoxville 17, Tenn.

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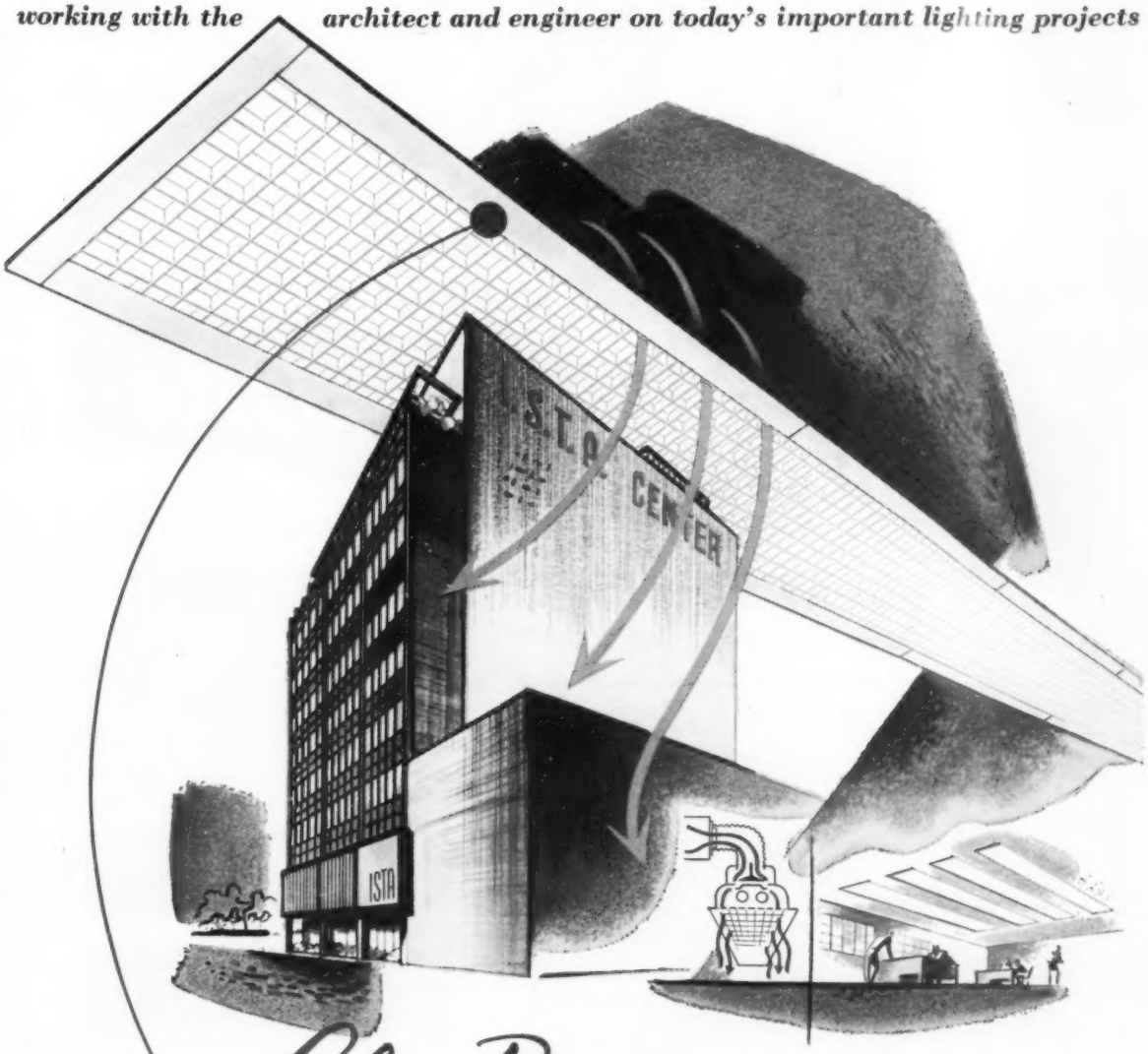
NISA, Electric Club of West Virginia. O. E. Jenkins, Secretary c/o Guyan Machine Co., Logan, W. Va.

working with the *architect and engineer on today's important lighting projects*



1 mile of *Ceiling Beauty* doing double duty

both lighting and air conditioning from one fixture!

These new double-duty fixtures bring a new freedom to creative architecture. Gone is that discord of fixtures and air outlets! Instead: clean-lined, uncluttered ceiling beauty. Air outlets are engineered right into the lighting system! Result: greater economy, comfort and ceiling beauty. No double installation problems . . . improved draft-free air diffusion . . . modern, well-diffused, high efficiency Benjamin troffer lighting. Free illustrated brochure brings you the whole fascinating story of this new 2-in-1 fixture. Write: Benjamin Electric Mfg. Co., Dept. Z-1, Des Plaines, Ill.

INDIANA STATE TEACHERS ASSN. CENTER—over a mile of Multi-Vent Trofferlites helps to make it Indianapolis' newest, most modern office building.

Architects: **McGUIRE & SHOOK AND ASSOCIATES**

Consulting Engineers: **J. M. ROTZ ENGINEERING CO.**

General Contractor: **LESLIE COLVIN**

Electrical Contractor: **HATFIELD ELECTRIC CO., INC.**

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—all of Indianapolis, Ind.

B-171

MULTI-VENT TROFFERLITES

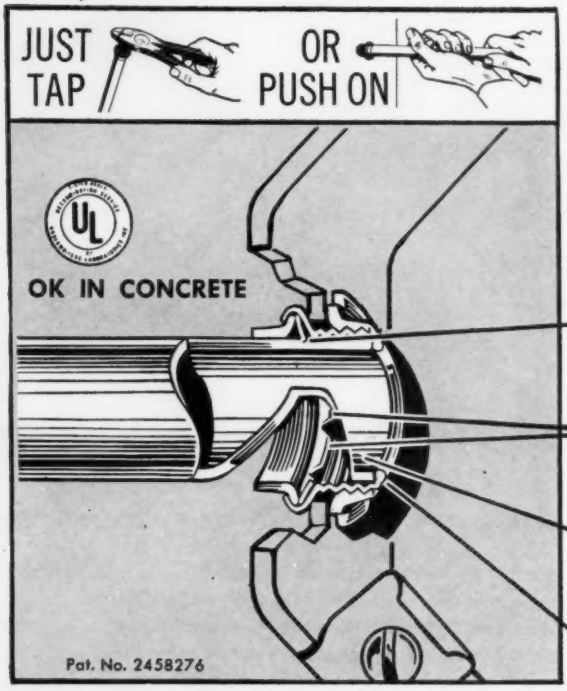
Multi-Vent® Air Diffuser by Pyle National Co. • Trofferlite by Benjamin Electric Mfg. Co.

BENJAMIN

...always the source of good lighting

The Switch is to Tap-Ons

TODAY'S FINEST EMT CONNECTORS!



No crimp, no screw, no wrench—just tap or push TAP-ONS on for the easiest, fastest, best thinwall job. And look at these other superior Tap-On features.

- Less pressure required than ever before. Just tap it on—it's that simple.
- Pre-flexed s.s. locking ring bites into tube—will never shake loose.
- Multiple contact around entire tube assures permanent ground.
- Only Connector that enables EMT to enter box.
- Rounded edge protects insulation of wire on a "hard pull."

ALL ORDERS SHIPPED WITHIN 24 HOURS

DISTRIBUTED THROUGH WHOLESALERS ONLY

TOMIC SALES & ENGINEERING CO.

ORIGINATORS and Manufacturers of Famous TAP-ON Fittings

20,000 Sherwood Ave. • Detroit 34, Michigan

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New 24-Page Treatise on Instrument Transformers

INSTRUMENT TRANSFORMERS
Theory and Operation
CONTENTS
Page
Function . . . 2
Types . . . 2
Polarity Marking . . . 2
Coordination of Insulation . . . 2
Impulse Protection . . . 3
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Corrections and Overall Accuracy . . . 21
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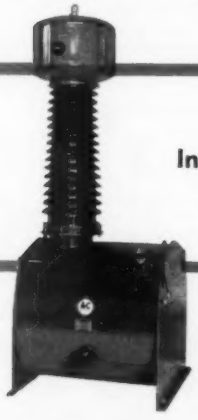
UTILITY metering superintendents, industrial electrical engineers, switchboard builders — here's a desk-mate you will consult often and profitably. Instructors in engineering schools and on-the-job training programs — you will want to use this informative bulletin as a textbook. It's the most complete treatise ever compiled on the theory and operation of instrument transformers.

Included are comprehensive data presented in handy reference form, typical performance curves and a handy ratio-phase angle correction chart.

Single or quantity copies are yours for the asking. Write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.



Allis-Chalmers Instrument Transformers Available in Over 400 Ratings

Name the application. There's an Allis-Chalmers instrument transformer that fills the bill precisely. Indoor, outdoor, dry-type, oil or compound-filled units — they are all available in the widest possible rating range.

ALLIS-CHALMERS

A-5386

CATALOGS and BULLETINS

Available Free to Readers of Electrical South upon Request

1011—Electrical Conduits

"Natural Electric Conduits" is the title of the 30-page Catalog No. 603 which describes and illustrates the many types of electrical conduits that are manufactured by National Electric Products Corp., 2 Gateway Center, Pittsburgh 22, Pa.

1015—Squeezon Connectors

The Squeezon, a new compression connector for power lines, is fully described in bulletin "SQ" available from the James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo. The Squeezon features greatly increased electrical and mechanical efficiency.

1019—Service Panels

Information on protective electrical control centers for homes, apartment buildings, service stations, and industrial applications is contained in Bulletin PM-355, "BullDog Pushmatic Electric-Centers," issued by BullDog Electric Products Co., 7610 Jos Campau, Detroit, Mich.

1071—Plugs and Receptacles

Additional loose-leaf sheets for insertion in the Pylet Catalog 1100 are available from the Pyle-National Co., 1354 N. Kostner Ave., Chicago 51, Ill. These pages describe a wide range of plugs and receptacles for special purposes.

1079—Washer Lugs

Krueger and Hudepohl, 1041 Evans St., Cincinnati, Ohio, in their Bulletin 8-DF, give information and catalog listings for their complete line of K&H solderless terminal folding double cupped washer lugs. The folder explains uses and applications of all the lugs.

1085—Lighting Fixtures

Eastern presents their most complete catalog, 32 pages of engineered lighting data, including a variety of fixtures for all architectural, commercial and industrial applications. Eastern Fixture Co., Inc., 170 Vernon St., Boston 20, Mass.

1087—Fittings Catalog

The M. & W. Electric Mfg. Co., Inc., East Palestine, Ohio, has available their new 28-page catalog 53, covering Service Entrance Mast Fittings, Service Entrance Cable Fittings, Ground Clamps, Rods, BX and Romex Connectors, Conduit Fittings, Wireholders, Insulators Supports and Cable Racks.

1097—Cord Catalog

A complete 48-page catalog is available from the Cornish Wire Co., 50 Church St., New York 7, N. Y. containing all data on flexible and portable cords, lamp cords, heater cords, cordsets, radio and electronic wires.

1099—Lighting Fixtures

Fluorescent and incandescent luminaires for schools, offices, stores and factories are illustrated in a series of bulletins issued by Curtis Lighting, Inc., 6134 West 65th St., Chicago 38, Ill. The entire series or any individual bulletins may be obtained upon request.

1103—Compression Connectors

Burndy's new Bulletin CR-1A features the new Crimpit technique for all overhead distribution connections. The bulletin provides information on the entire Cripit line, including details of hydraulic installation tooling and accessories. Copy available from Burndy Engineering Co., Inc., Norwalk, Conn.

1107—RW and RHW Wire

"The Ampere Squeezer," a booklet explaining visually the effect of ambient temperatures on current carrying capacities of RW and RHW Wire. Simplex Wire & Cable Co., 79 Sidney St., Cambridge 39, Mass.

1109—Anchoring Devices

An illustrated 32-page catalog, No. 65, describing more than 25 anchoring and drilling devices for making fastenings to masonry, is available from the Arro Expansion Bolt Co., Marion, Ohio.

1135—Wiring Devices

Catalog No. 51, containing complete electrical wiring device line of Leviton Mfg. Co., Brooklyn 22, N. Y. is a 96-page thoroughly illustrated one. Included are such features as the Kwik-Change line, with wiring diagrams, a general index, and an index to catalog numbers.

1155—Wire and Cable

Two catalogs—Bulletin RS-5, and Power and Control Cables, No. 24—available from Rome Cable Corp., Rome, N. Y. Power and Control Cables catalog is intended for utility, construction, and industrial engineering and purchasing personnel as a guide in selection of proper wire and cable types.

ELECTRICAL SOUTH
806 Peachtree St., NE
Atlanta 8, Ga.

July, 1957

Gentlemen:

Please send me the bulletins and catalogs indicated.

(Print Plainly)

Name _____ Title _____

Company _____

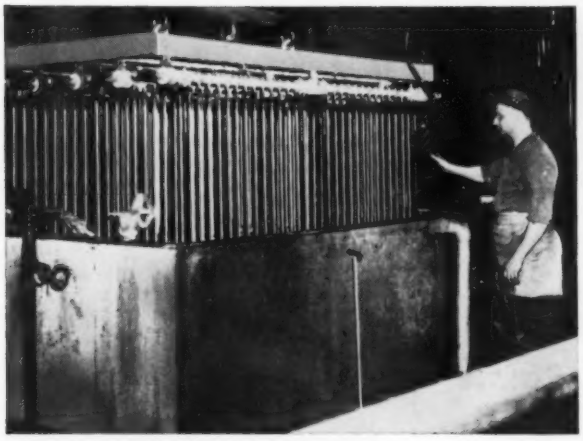
Address _____

City & State _____

Circle numbers below. Bulletins and catalogs will be mailed promptly.

1011	1015	1019	1071	1079
1085	1087	1097	1099	1103
1107	1109	1135	1155	1167
1175	1195	1197	1209	1211
1219	1223	1227	1229	1231
1233	1237	1239	1241	1245
1251	1253	1255	1257	1259
1261				

these 4 SPANGLEAM features help you make better EMT installations!

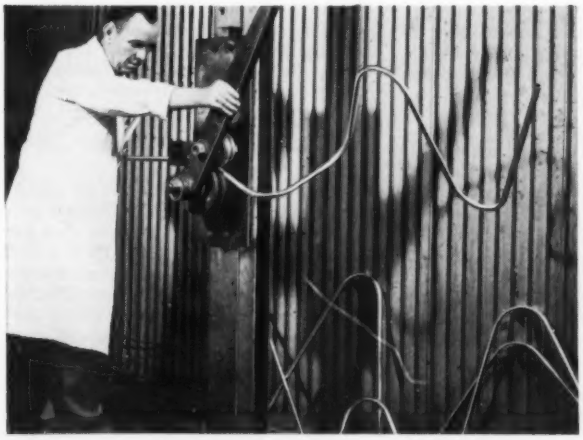


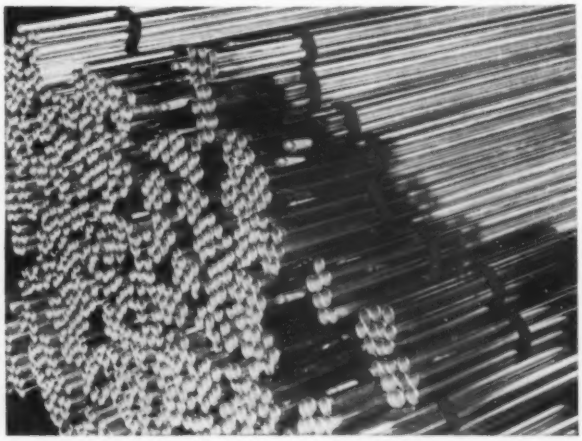
1 SPANGLEAM FINISH

First step is the application of a uniform electro-galvanized finish; then the tubing is dipped in the special-formula SPANGLEAM solution. Result: a bright, durable finish that has high corrosion resistance, makes an excellent appearance in exposed locations.

2 QUALITY TESTING

To be sure the SPANGLEAM finish more than meets UL requirements and Federal Government Specifications WW-T-806b, a random sample from each lot of SPANGLEAM is subjected to the copper-sulphate Preece Test. Any EMT that does not measure up is discarded. You get only the best!





3 MECHANICAL TEST

Sample lengths from each lot of SPANGLEAM produced are bent in all directions well beyond normal requirements to test weld and finish. Any rupture of weld or flaking of finish causes that lot to be discarded. Inspection is also conducted for uniformity of diameter, straightness and finishing.

4 SAFETY PACKAGE

SPANGLEAM EMT is bundled automatically for shipping in blue plastic tape. This tape assures a tight package, prevents individual lengths from slipping, provides easy handling, better storage and quick identification and inventory. Saves you time, prevents accidents!

Convince yourself that you can make fast, money-saving installations with SPANGLEAM EMT. Order SPANGLEAM for your next job from your local Spang Distributor.

SPANG CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
TWO GATEWAY CENTER, PITTSBURGH, PA.
District Offices and Sales Representatives in Principal Cities

1167—Industrial Lighting

A four-page catalog insert is now available from the Multi Electric Mfg. Co., Inc., 4223-43 West Lake St., Chicago 24, Ill. The leaflet describes Multi's line of lighting equipment and wiring devices, which include floodlights, vaporproof fixtures, and fluorescent and incandescent fixtures.

1175—Fish Tape Leader

The new fish tape leader for hand tapes is described in an information sheet offered by The Barth Corp., 12650 Brookpart Rd., Cleveland 30, Ohio. The "Snake Charmer" facilitates pushing tapes in all runs and promotes correct twist at reverse elbows.

1195—Kitchen Ventilation

Descriptive eight - page folder, Bulletin 620H, showing typical installations of all models in the Clipper line of ventilators is available from Trade-Wind Motorfans, Inc., 7755 Paramount Blvd., Rivera, Calif. Folder includes dimensional drawings of installations helpful to building and electrical contractors.

1197—Convenience Outlets

Four-page bulletin gives complete information on the new P&S No. 500 for adding extra outlets to existing installations. Everything you need in a single package—on steel boxes required. Available from Pass & Seymour, Inc., Dept. ES, Syracuse 9, N. Y.

1209—Fluorescent Ballasts

Advance Transformer Co., 2950 N. Western Ave., Chicago 18, Ill., has recently completed the compilation and printing of a 20-page catalog on fluorescent ballasts and their use. Included are data sheets on available Advance ballasts and a comprehensive installation and operation section and testing procedures. Copies of the booklet are available on request.

1211—Fluorescent Fixtures

Catalog folder No. 911, "Peerlite by Guth," has been announced by the Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo. Copies of this new eight-page booklet are available from the company upon request. The booklet is designed for the lighting specialist, giving complete engineering data and dimensions.

1219—Electrical Enclosures

Catalog No. 5354-U is a 66-page catalog describing the complete line of steel and aluminum electrical enclosures manufactured for utility use by the B & C Metal Stamping Co., 590 Means St., N. W., Atlanta, Ga. The catalog is well illustrated and contains complete specifications as well as prices on all items in the B & C line.

1223—Circuit Protection

A 24-page illustrated handbook contains suggestions for selecting the right kind of protection for electric paratus. Includes motor wiring diacircuits, motors, appliances and apgrams and a complete list showing proper size fuses to use. Available from Bussman Mfg. Co., University at Jefferson, St. Louis 7, Mo.

1227—Conduit Fittings

A new complete 4-page catalog illustrating their complete line of conduit fittings and lighting parts for the electrical wholesaler has been made available by Elliott Electric Products Co., 1513 Olmstead Ave., New York 62, N. Y.

1229—Switch and Outlet Boxes

A new RACO General Catalog is now available listing detailed information on boxes, covers, and bar hangers. The catalog includes data on numbers of wires permitted per box and a list of comparative catalog numbers. Copy available from All-Steel Equipment, Inc., Aurora, Ill.

1231—Conduit

A handy, pocket-size booklet illustrating and describing four ways to greater conduit efficiency and lower installation costs has been published by Youngstown Sheet and Tube Co., Youngstown, Ohio.

1233—Troffer Catalog

A 36-page catalog, with complete information on their newly re-designed architectural troffers has been released by Smithcraft Lighting Division, Chelsea, Mass. Divided into sections for selection of lighting units, the catalog gives complete illustrations and data for 1 and 2 foot troffers in all types of ceiling construction. Also included in the catalog is information on ceiling lighting patterns, shielding designs, lighting techniques and applications.

1237—Wireholders

Knox Porcelain Corporation, Knoxville 1, Tenn. has recently redesigned a one-piece metal base style reinforced wireholder, No. 5009. Base and screw are hot dipped galvanized. This wireholder has extra sharp threads and quick starting point to make driving easy. KNOX manufactures a complete line of Porcelain Wireholders, House Brackets, and other Secondary Service Materials.

1239—Heavy and Light Duty Power Derricks

J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio has available a 4-page catalog on the Series 4700 Power Derrick—a light-duty derrick that lifts loads to 6500 pounds, poles to 55 ft. They also have available a catalog on 3700 Power Derrick containing data on derricks for lifting poles up to 75 feet long and loads up to 12,000 pounds.

1241—Fans

A convenient file folder covering attic and industrial ventilating fans, up to 108" diameter, is available upon request from American Coolair Corporation, Box 2300, Jacksonville 3, Florida. The attractively illustrated catalog pages are bound into the folder, which is available with or without list price sheets.

1245—Exhaust Fans

Two new two-color illustrated four-page catalogs (Bulletin Nos. 6414 & 6514) describing the new Model G Ventura fans for business and commercial exhaust applications and Model K for industrial heavy-duty exhaust applications are now available from American Blower Corp., Detroit 32, Mich.

1251—Radiant Heating Cables

Three folders, describing Ceilheat's three types of radiant cables, are now available from Ceilheat, Inc., 5212 Homberg Dr., Knoxville, Tenn. One folder features the Aristocrat radiant cable for plastered ceilings, another describes Ajax radiant cable for concrete floors, and the third describes Dri-Cell radiant cable for dry-wall construction.

1253—Power Connectors

A completely new catalog (No. 526) of power connectors and bus support clamps is now available from Southern States Equipment Corp., Hampton, Ga., superseding catalog No. 525-R. Furnished in a handsome 7-ring binder, the new catalog includes sections on bus support clamps, couplers and angle braces, bar connectors, Tee connectors, stud connectors, ground connectors, parallel clamps, and terminals.

1255—Electrical Tools

Tools for electrical construction, such as Hydraulic Benders, Hydraulic Pipe Pushers, Knockout Punches and Hydraulic Drivers, Cable Pullers, Screw Anchor Expanders, Pipe-Size Bits, etc., are shown in Catalog No. 35-E, published by Greenlee Tool Co., 2136 Twelfth Street, Rockford, Ill.

1257—Centrifugal Roof Ventilators

An 8-page, two-color folder (SDA-220) giving construction features, performance data, dimensions and recommended specifications for the new Centrifugal Roof Ventilator manufactured by The Peerless Electric Company, Warren, Ohio. Other important Peerless Fan and Blower products and a list of Peerless sales representatives are also included.

1259—Electrical Tapes

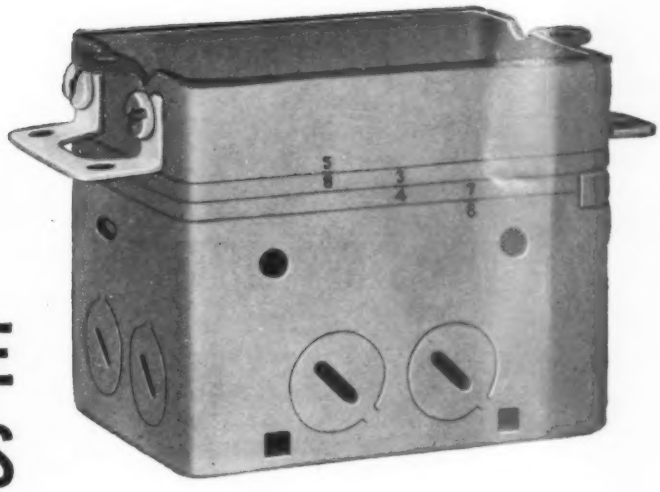
Twelve pages of specifications and application data make up an attractive booklet on Dutch Brand Electrical Tapes. Plastic, friction, and rubber tapes, as well as a vinyl tape made in nine different colors, are available from Dutch Brand Division, Johns-Manville, 7800 So. Woodlawn Ave., Chicago 19, Ill.

1261—Cable Puller

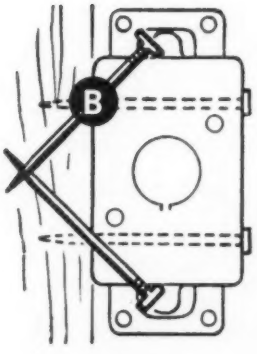
The electrically powered cable puller manufactured by The Barth Corp., 12650 Brookpart Rd., Cleveland 30, Ohio, is described in a new booklet. This tool is ideal for industrial and commercial construction and maintenance.

NOW!

NON-GANGABLE SWITCH BOXES

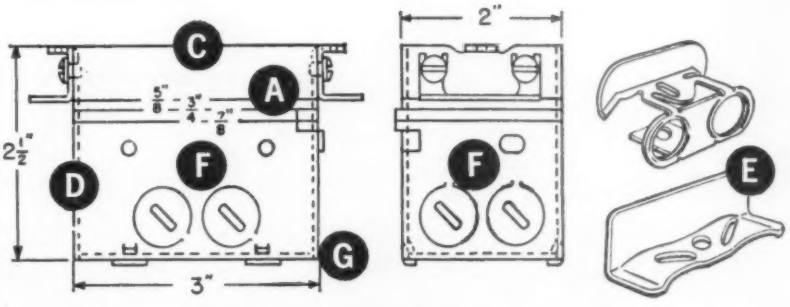


Join the National Electric "Redege" Line



11 NG series
for non-metallic sheathed and flexible cable

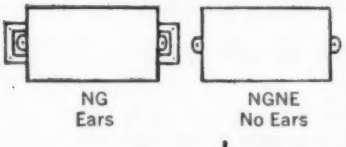
12 NG series
for armored cable and flexsteel conduit



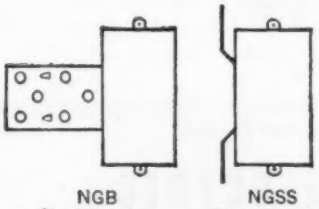
Check these features:

- **A** Plaster line gradation marking on the box
- **B** Diagonal and through nail holes
- **C** Plenty of capacity (12.8 cubic inches)
- **D** 14 gauge electro-galvanized steel
- **E** 2 cable clamps (each type)
- **F** 2 pri-outs—each end and each side
- **G** Square corners

4 Combinations Available



NG Ears — NGNE No Ears



NGB Stud Bracket — NGSS Strap Bracket

Cat. No.	Cat. No.	Type	Sides	KO	Cable Pri-Outs	Wgt. Per C	Std. Pkg.
11NG	12NG	Ears	Straight	1—½" KO in Bottom of Box	2—21/32" in each Side and End	74	50
11NGNE	12NGNE	No Ears	Straight			70	50
11NGB	12NGB	Bracket	Straight			88	50
11NGSS	12NGSS	Strap Brac.	Straight			84	50

Listed by Underwriters' Laboratories Inc.
Stocked by Leading Distributors everywhere.

National Electric Products

PITTSBURGH, PA.
2 Plants • 12 Warehouses • 41 Sales Offices

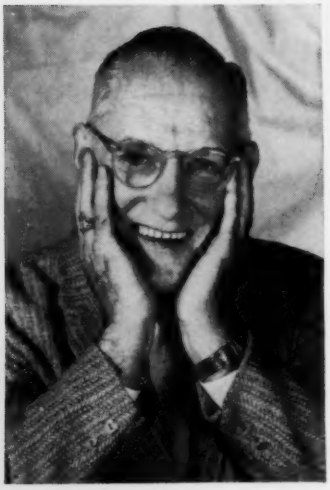
A month ago we ran this ad

"This kit
helped me
sell three lighting
jobs worth $1,300 . . . all the same day"
New General Electric "Plan-It-Yourself" Lighting Layout Kit
can help you sell More Lighting Jobs, Too!
1 YOU'LL SELL EDGED
2 YOU'LL "SELL UP".
3 YOU'LL "CLOSE" MORE SALES.
Progress Is Our Most Important Product
GENERAL ELECTRIC

A week ago Harry wrote:

"It's too bad you ran that ad so soon. I have since completed an installation of 23 four-lamp, 8-foot fixtures, and then submitted a layout of 44 fixtures for a supermarket addition. I not only sold the 44, but an extra 56 as well to replace the old store lighting! That's $6,500 worth of lighting business!

"Now I'm going to have to re-read the ad and buy another kit. I'm out of 8-foot stickers!"



Latest picture of Harry!

(And who wouldn't smile? According to Harry, "that $6,500 means a profit increase of about 500%!")

This new General Electric "Plan-It-Yourself" Lighting Layout Kit can help you sell more lighting jobs, too—so get yours today from your local G-E Lamp Supplier. Or send $1.75 to: General Electric Co., Large Lamp Dept. ES-77, Nela Park, Cleveland 12, Ohio. There are still a few kits left!

Progress Is Our Most Important Product

GENERAL ELECTRIC

MEN RESPONSIBLE FOR

POWER DISTRIBUTION KNOW...

IF IT'S PARANITE IT'S RIGHT!®

FROM AERIAL TO UNDERGROUND CABLE . . .

Paranite has a cable specifically engineered to meet your most rigid requirements! Super-Pararite® butyl rubber insulations have been developed to withstand special conditions in *your* area Copper or aluminum bare or weatherproof cables — ACSR or line wire (formerly products of Midland Wire Corporation) are available.

PARANITE WIRE AND CABLE

DIVISION ESSEX WIRE CORPORATION

Factory: Birmingham, Alabama

WAREHOUSES* AND SALES OFFICES

*ALABAMA, BIRMINGHAM, 2901 35th Avenue, North; TENNESSEE, MEMPHIS, 4880 Kaye Road; TEXAS, DALLAS, 1919 Levee Street

No poorly-lit areas in this large office, illuminated with interchangeable light panels.

How flexible fluorescent lighting

Q-floor electrical distribution system in new Little Rock, Arkansas, office building has slashed upkeep expense, while providing adequate facilities for future electrical equipment requirements.

By S. W. Ellis

This article should be especially helpful to the following readers:

- Electrical Contractors ✓
- Electric Utilities ✓
- Electrical Wholesalers ✓
- Electrical Inspectors ✓
- Industrial Engineers
- Consulting Engineers ✓

◆ OUTSTANDING FLEXIBILITY of lighting and power distribution is making news in low maintenance costs and service for tenants of the National Old Line Insurance Company office building at Little Rock, Ark.

A combination of structural factors provide this new building, containing 76,432 square-feet of floor space, with interchangeable light units for every 12-inches of ceiling space, and with floor outlets that permit all wires to come through the floor. Because all walls are movable partitions, changed to suit the needs of tenants, floor outlets have valuable utility.

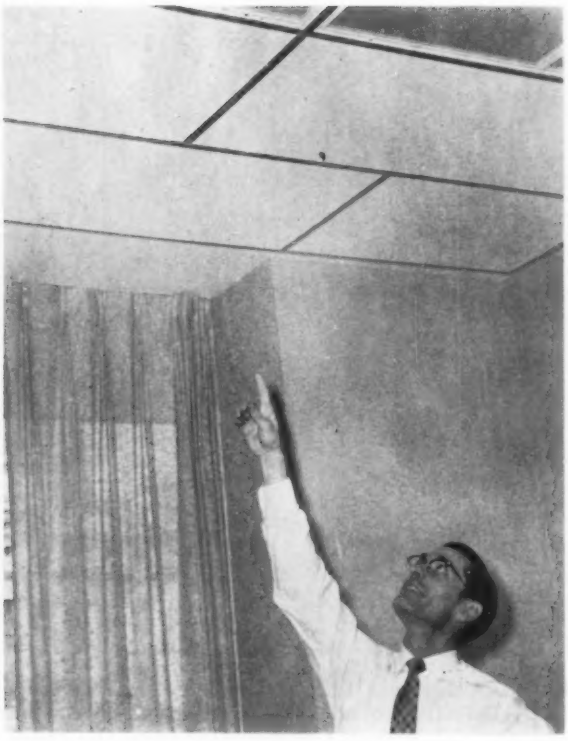
The Q-floor method of electrical distribution is used throughout the building. This method includes a cellular steel beam, which is the structural and load-carrying element, plus a complementary system of crossover headers, or cell feeders. The headers permit the pulling of wires from a panel box to any of the cells in the floor area. Each type of service—telephone, power, signal, etc.—requires a separate header to feed its particular cells.

Q-floor cells grounded

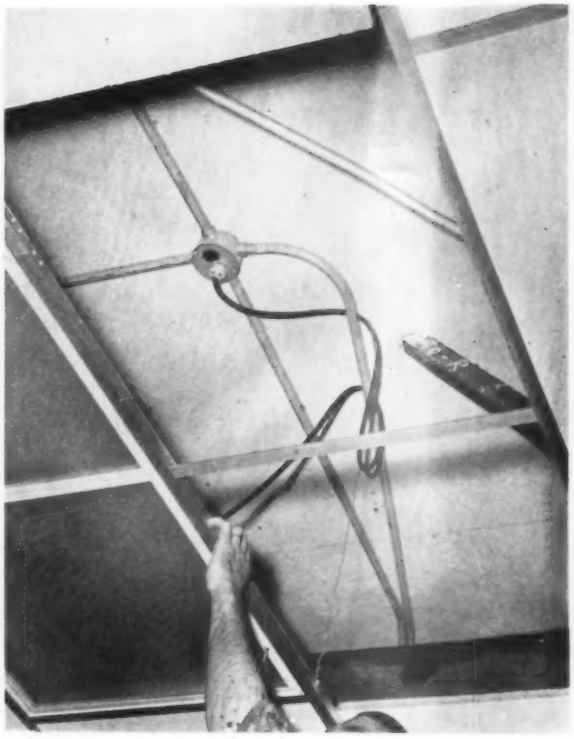
The load-carrying cells of the Q-floor, running parallel to each other every six-inches across the building, provide built-in raceways. Fastened to the supporting frame, Q-floor cells are positively grounded. They provide an abundance of room for pulling wire and telephone cables.

Over the Q-floor is poured 2½-inches of concrete, using a special lightweight aggregate.

All air-conditioning, plumbing, and electrical construction was done by the Fagan Electric Company and the Fagan Air-Conditioning Co., Little Rock. Changes in wiring are made by the maintenance staff of the building.



Fixtures and fiberglass panels are the same dimensions and interchangeable.



Fluorescent lights are plugged into ceiling receptacles, spaced 12" apart, behind movable fiberglass panels.

can lower maintenance costs

Installing a new floor outlet is simple. The mechanic cuts through concrete floor surfacing and fill, saws a hole into top of the Q-floor unit, pulls wire from panel box to junction unit and then to outlet hole. The wires are then connected to floor outlet head, which is provided with plug-ins for service.

One of the outstanding features of the building is the ceiling construction for the six floors. Below the fireproofing material on each ceiling is hung an acoustical ceiling consisting of an aluminum grid into which are set movable fiberglass panels. This false ceiling conceals piping, ductwork, and wiring for lights, and makes possible inspection or revision of the mechanical and electrical installations.

Use of fluorescents

All panels and light fixtures are interchangeable. The same flexibility is available in the ceiling diffusers of the air conditioning system.

Illumination is supplied by 726 fluorescent light fixtures, some measuring 2′ by 4′, some 2′ by 2′. These are suspended in the acoustical ceiling, the flexible cords plugged into the ceiling receptacles. Receptacles are spaced only 12" apart, each made available by the sliding panel. In one large general office, the lighting is so arranged that, throughout the trea, uniform illumination of 112-foot candles is provided.

Commenting on the utility of Q-floor wiring and flexible lighting, Building Manager J. E. Vise said: "Maintenance cost is lower now, and we have future facilities for electrical equipment. This is a grave problem in building management. The old system of pulling in separate conduits and running out separate circuits was costly and inadequate for growing light and power needs.

"Our tenants value the floor outlets. Except in a few temporary installations, we have no wall outlets in the building."

Because wiring and air-conditioning are so closely linked with structural features of this attractive building, a brief description is in order. The building is T-shape, with the head of the T rising five-stories above the ground floor, and the stem, two-stories therefrom. The 800-ton skeleton of the building is composed of steel members welded together, with no columns in any office area. The steel frame is enclosed by walls of masonry and glass. The glass walls are virtually continuous on each floor, all fixed except for ventilating sections every 16 feet. East and west walls are glazed with heat-absorbing glass, the others with clear plate glass.

In addition to the use of heat-

(Continued on page 107)

BEFORE—This Jefferson Avenue section in Dallas was illuminated with 31-15,000 lumen, mercury vapor, asymmetric luminaires on wooden poles in street-center.

Fluorescent luminaires combine

Mushroom growth of Dallas, Texas, since World War II has brought with it an intensive demand for more and better street-lighting. Public Utility Supervisor J. W. Monk has come up with an illumination program which is enhancing the city.

◆ IMPROVED AND EXPANDED street illumination is making downtown streets of Dalas, Texas, safer for traffic and pedestrian use, giving better light for motorists on important through-ways, and helping the city's police department guard against potential crime in business and residential areas.

The rapid growth of Dallas since World War II has put a heavy job on J. W. Monk, city supervisor of public utilities, especially in meeting the demands for more street-lighting.

A third important factor is the intangible, yet obvious need of beautifying a major city commensurate with its importance in the state and nation.

"We take all these factors into consideration in planning the expansion of street illumination," explains Monk. He is winning general public approval of his program, primarily because he and his aides are careful to take the public and taxpayers—who, after all, foot the bill—into their confidence before they make a major program final. Monk emphasizes that public desires are considered first of all, not only in placing street lights in residential areas, but even in types of poles and lights, and their positions along major thoroughfares. For instance, Monk has found that Dallas motorists prefer "split-street" lighting, perhaps because it gives them more of a feeling of security to be separated from oncoming traffic at night.

This additional illumination is reflected in figures given by Monk, who reports that "in our postwar street-lighting program, it was obvious that the accent must be on traffic-thoroughfare lighting. Also, it should be noted that in planning, lighting for these costly street improvements, it was deemed advisable in most instances to use a special type of equipment commensurate with the new thoroughfares and their environment."

On downtown streets and boulevards with split-street lighting, as well as in more attractive neighborhood shopping areas, metal light poles are used. Wood poles are used generally for single street lights in residential areas. In some residential shopping districts, wood poles are used, but by special painting and designs the esthetic effect is similar to that of metal poles.

Utility carries load

Street-light installations are made by the Dallas Power & Light Co. by contract with the city of Dallas under a section of the utility's franchise to operate. The city stipulates types and locations

AFTER—The same section is now lighted with 144-21,000 lumen, multiple fluorescent luminaires on twin-type ornamental standards (Union Metal 350-H-300 XXOB).

beauty, safety in city streets

for lights. Dallas Power & Light buys the equipment and materials, provides the labor and technical know-how, and retains the installations as part of its physical investment in the city. The utility bills the city at a rate based on its operating franchise. This billing is separate from that charged for electrical energy required for the street lights. Monk points out, incidentally, that Dallas has what he calls an exceptionally fine rate of 5½ mills in its contract with DP&L for street illumination electricity.

In the past six years, the Dallas Power & Light city street-lighting investment has increased from about $578,000 to $1,776,000.

Since 1950, the city has installed 43 miles of high-level illumination on divided roadway throughfares. In addition, there are about six miles of lighting which have been installed and are operated jointly with the State of Texas on the central expressway.

Net cost of the 43 miles included in the city system has been about $434,000. Together with the white ways in the business districts in downtown Dallas and in the Oak Cliff section, the cost of special, or project, lighting has been about $717,000, more than half the total increase in the street lighting investment since 1950.

Sharing the spotlight, especially in the past few years, has been the modernization of the retail business street white ways in downtown Dallas and Oak Cliff. Oak Cliff, now an integral part of the Dallas municipal area, is, because of geographical reasons, virtually a separate community across the Trinity River. It has suffered from this isolation. Since the war, a residential trend to the south has enhanced the value of Oak Cliff, and it is getting more attention from city planners. At the same time, business operators and homeowners in Oak Cliff have taken a new lease on life and are sprucing up. The older places are being renovated and new construction is widespread. Coincident with this dressing up by property owners has been civic improvement, including improved street illumination.

By Bicknell Eubanks

This article should be especially helpful to the following readers:

Electrical Contractors	
Electric Utilities	✔
Electrical Wholesalers	
Electrical Inspectors	
Industrial Engineers	
Consulting Engineers	✔

Investment increase

"Great strides have been made in the downtown and Oak Cliff projects," Monk says. "Suffice it to note, this phase of the program has increased the street lighting investment by $220,000. Additional improvements in the remainder of the Dallas business district by the installation of mercury vapor lights on metal posts have added

(Continued on page 113)

S. W. Rothman, S and L Electrical Contractors, Washington, D. C., makes an emergency disconnection. Many emergency calls are due to failure of outmoded and inadequate wiring services in old dwellings.

Each emergency truck carries a stock investment of approximately $600 and is manned with specially trained troubleshooters. Trucks carry many unusual materials needed in repairing old type wirings.

Emergency service pays off

By Samuel W. Rothman

Master Electrician
S & L Electrical Contractors
Washington, D. C.

This article should be especially helpful to the following readers:

Electrical Contractors ✔
Electric Utilities
Electrical Wholesalers
Electrical Inspectors
Industrial Engineers
Consulting Engineers

◆ WE SPECIALIZE in emergency service. A call to our office any hour of the day or night, Sundays or holidays, will start our emergency trucks rolling within minutes. Manned with mechanics specially trained in trouble shooting, each truck carries a stock investment of approximately $600.

Our large inventory of over 1,400 items (cost of stock, $15,000) includes many unusual materials like old porcelain block of 15, 60, or 100 amp.; the 30 amp. meter switch in use 15 years ago; armored cable to replace wooden molding; and other items needed in the repair of old type house wiring. A great many of our emergency calls from homes and business are frequently due to outmoded and inadequate wiring services in old-time dwellings.

Creating goodwill

We began specializing in emergency work in '44 by preference. With over 40 years of diversified electrical experience, including emergency repairs in both private and government service, we discovered a preference for emergency work. It is a very productive source of larger jobs, furnishing leads that offer little competition. It creates enormous goodwill—being of assistance when it is difficult, and sometimes impossible, to find an electrician in the middle of the night or on a Sunday afternoon. There is a steady turn over of work, 60% of which is paid for on the spot.

Operating costs are higher on emergency work than on an extended electrical wiring job. However, the long-range estimate with its component of gamble is absent here.

The contractor who specializes in emergency work must let the public know he is ready to jump to the rescue at a moment's notice. A large advertisement in the yellow classified directory of the telephone book underscores our 24-hour service. We also advertise in civic and community publications throughout the year. During February, June and August we place

(Continued on page 111)

Employee stock purchase plan

Making company stock available to worthy employees has brought gratifying results to this contracting firm, including tripling of dollar sales.

A. H. Johnson
President
A. S. Johnson Co., Inc.
Washington, D. C.

This article should be especially helpful to the following readers:

- Electrical Contractors ✔
- Electric Utilities
- Electrical Wholesalers ✔
- Electrical Inspectors
- Industrial Engineers
- Consulting Engineers

With no fourth generation family member to take over reins of this bustling, 82-year-old Washington, D. C., company, it looked like "curtains" for its future less than five years ago. Then President A. H. Johnson came up with his employee stock purchasing plan. . . .

◆ AFTER MUCH CAREFUL thought and planning, we have worked out a stock purchasing plan for our key employees that has proven most successful, one that may be incorporated by any electrical contractor.

It was evolved because of a situation which had periodically plagued our company, the retention of our trained supervisors from pirating by competitors. Such separations, when employees reach their productive peak, require costly recovery periods.

Operating a closed corporation that had been handed down from my grandfather, with no fourth generation to take my place, I found the future of this old, established firm was greatly jeopardized. Continuation of the business after my retirement or death posed a serious problem. Having put a life-time of effort into its growth and development, I could readily see that the future offered nothing either for me or for my estate.

Employees considered

The plan that I drew up to share my business with key employees culminated a long period of anxiety and search for a solution.

In my case, there were five employees who had proven their worth. They were my chief engineer, sales manager, metal shop supervisor, office manager, and refrigeration service manager. These men had been with me for at least five years and were top-flight managers in their respective departments.

Having my plan thoroughly checked by an attorney, as well as by the Internal Revenue Department, I presented it to the five. After a lengthy discussion on pros and cons, an understanding was reached with few changes in my final draft of the agreement.

Bear in mind, I had designed the plan for the full benefit of all concerned, so that all six of us would be protected. It was agreed that, if it was to work, it had to benefit all of us, and on that basis, the final agreement was made.

The basic plan was to divide 49% of the net profits before taxes between the five department heads on a prorata basis, with the understanding that it would be used for stock purchase when individual taxes had been paid. Based upon productivity in our case, the 49% was prorated on the basis of 14% each to the three departmental heads, 5% to the office manager and 2% to the service manager.

The existing book value of the corporation was used as a starting point. They were to match this amount on a 51/49% basis from their share of yearly profits, and it was hoped that the plan could be culminated in five years. I further agreed to allow my share of the profits to remain in the business for working capital during the life of the plan, withdrawing same then, so that the 51/49% stock ownership would be established. After that, business conditions would dictate profit distribution on outstanding stock. Naturally, it was necessary to increase our no par value stock issue to cover its purchase by the employee purchasing of same.

Hypothetical example

Here is a simple explanation of the plan (hypothetical figures):

(Continued on page 110)

William Foulks, vice-president of Curtis Lighting, Inc., addresses enthusiastic final meeting on the topic, "Candles and Comfort." Average attendance at each of the seven meetings hit the 85 mark.

Florida utility, IES join hands

Tampa Electric conceives the idea of making friends among electrical contractors, their electricians, and engineers with a seven-phase course on commercial and industrial illumination.

◆ WHEN AN ALERT utility joins hands with an organization, such as the Illuminating Engineering Society, to educate electrical contractors, their electricians, and jobber salesmen on basic concepts of simple lighting installation design, one might reasonably expect the generating of much enthusiasm on the part of all concerned.

And that's exactly what happened recently when the Tampa Electric Company's Lighting Department and the Florida Section of IES undertook joint sponsorship of a lighting refresher course, closely followed by a seven-phase advanced course on lighting.

For years, Tampa Electric's Lighting Department had offered a free lighting consultant service to customers. This included the furnishing of blueprints to indicate lighting equipment location, as well as specifying the broad family categories of lighting equipment, avoiding the singling-out any one manufacturer's equipment. The company abstained from laying out wiring, as it was felt that in so doing, it would be encroaching on that field reserved for qualified engineers and contractors. By confining its recommendations solely to lighting, on the other hand, the company felt that it furnished a service as lighting expert which invaded nobody's field.

While the number of lighting jobs steadily increased from year to year, Tampa Electric realized that such constituted only a fraction of the total installations being made in its territory. And they were convinced that steps should be taken to educate electrical contractors, jobber salesmen, and others to the point where they could design the simpler lighting installations, yet continue to call on the company as the expert to assist them on more difficult installations.

Lighting course planned

It was at this point that the utility conferred with Florida IES Section officers and the idea of the lighting course was born.

To it were invited all electrical contractors, their employees, jobber salesmen, architects, engineers, and the local IBEW Union #108.

The course, in seven lessons, with two given per month, began in mid-December last year and carried through this past March.

It's graduation night and James A. Banton, left, Tampa Electric illuminating engineer, looks on while Tampa Electric President W. C. MacInnes hands diploma to Jerry Jackson, apprentice electrician.

to sponsor lighting courses

Topics, though varied, bore a distinct relationship, each presented by a specialist in the field. In order, they included:

(1) "The Language of Lighting," James A. Banton, illuminating engineer, Tampa Electric Co.

(2) "Lamps," M. L. Harkey, district engineer, Lamp Division, General Electric Co.

(3) "Lighting Design," Mr. Banton.

(4) "Store Lighting," E. A. Bartlett, manager, Lighting & Lamp Dept., Graybar Electric Co.

(5) "Office Lighting," John J. Neidhart, applications engineer, Miller Lighting Co.

(6) "Industrial Lighting," E. B. Bradford, Florida representative, Benjamin Electric Manufacturing Co.

(7) "Candles and Comfort," William Foulks, vice-president, Curtis Lighting, Inc.

The fact that 72 persons, approximately 50 per cent of those enrolled, attended for credit and received "diplomas" was significant. A majority had worked all day as electricians, rushed home, eaten supper and dressed, and were present at a 7:30 p.m. meeting.

The local IBEW Union #108 gave complete cooperation and endorsed the course. The union's entire journeyman's class, together with their instructors, attended each meeting for credit.

Courses are popular

At the conclusion of the course, the following questions were asked, with the assurance that Tampa Electric wanted the honest opinion of each participant, whether favorable or unfavorable:

"Did you think the course was worthwhile?"

"Do you feel the time you spent in attending the meetings was worth your while?"

"Do you feel that another similar meeting should be held next year?"

"If a similar meeting is held next year will you plan to attend?"

Replies to each question were a unanimous "yes."

The average attendance at all meetings was 85 persons, with 167

(Continued on page 107)

By James A. Banton
Illuminating Engineer
Tampa Electric Company
Tampa, Fla.

This article should be especially helpful to the following readers:

- Electrical Contractors ✔
- Electric Utilities ✔
- Electrical Wholesalers ✔
- Electrical Inspectors
- Industrial Engineers
- Consulting Engineers ✔

NECA's Southern District gets wiring market facts

◆ THE PRIMARY function of National Electrical Contractors Association district meetings is to bring to the attention of members the services their association offers and to suggest how these may be turned into direct benefits.

As for a specific theme for NECA's Third District annual meeting at Roanoke, Va., May 26-29, Charles S. Thurber, NECA regional director from Atlanta, commented: "We're here to get electrical work for the qualified electrical contractor—it's as simple as that!"

There was in attendance an eminent contingent of NECA officials from the Washington office, including Executive Vice-President Paul Geary, Apprentice Training Director Bill Damon, and Technical and Training Specialists Charles Hart and Kenneth Maddox.

By Sid Wrightsman, Jr.
Associate Editor
Electrical South

This article should be especially helpful to the following readers:

- Electrical Contractors ✓
- Electric Utilities ✓
- Electrical Wholesalers ✓
- Electrical Inspectors
- Industrial Engineers
- Consulting Engineers ✓

States comprising the Third District of NECA include Georgia, Alabama, Florida, Mississippi, Louisiana, Tennessee, North and South Carolina, and Virginia; and the various chapters in each were well-represented by registrants. Formerly included in the Fifth District, Louisiana, by action taken at the NECA national convention at San Francisco last year, was transferred to the Third District; and this represented its initial representation at a Third District meeting.

President J. M. Murphy of the Virginia Chapter, Roanoke, called the meeting to order officially with the introduction of Mayor Walter S. Young of Roanoke.

Third District Vice-President Carl L. Teal, of the Knight Electric Co., Birmingham, Ala., responded to the welcoming remarks. He then introduced Davis Elliot, Roanoke electrical contractor and Virginia Chapter member, who is currently

Among the members of NECA's Board of Governors in attendance were D. B. Clayton, Sr., Birmingham; J. M. Joseph, Jacksonville; Henry F. Barksdale, Atlanta; Ben P. Waters, Columbus, Ga.; K. D. White, Southeastern Industrial, Atlanta; James Dandelake, Southeastern Line Constructors, Jacksonville; Harry W. Mentrup, New Orleans; Ralph K. Robinson, Charlotte; W. G. Hoffman, Knoxville; James N. Stansell, Nashville; Carl Teal, Birmingham; Charles Moseley, Charlotte; E. L. Walker, Shreveport; E. H. Sheaton, Miami; Isaac Duncan, North Wilkesboro, N. C.; and Charles Thurber, Atlanta.

president of Roanoke's Chamber of Commerce. The latter then introduced Clem D. Johnston of Roanoke, past-president of the United States Chamber of Commerce, who spoke assertively on the American free-enterprise system as opposed to the creeping socialistic trends in present government.

Socialism a danger

Said Johnston: "This is only the beginning of elaborate federal controls in what is supposed to be a free economy of agriculture, labor, business, and industry.

"The right to plant is a privilege which the government grants. The right to work has become a qualified right with labor unions, the undisputed spokesman for labor.

"The original idea of government was one of limited powers. But this has changed into an ever-expanding one, with loss of our cherished individual freedoms, one by one," he continued.

"Let's look at the record: in 1956, 14,000 farmers were fined over $8-million for defying a government which had ordered them not to plant certain crops. Right now, the federal government subsidizes them all to the tune of $5-billion annually.

"As for labor, unions are recognized private organizations, exempt from protective monopoly laws of the nation. And who formulates policies and programs for those unions? The union bosses do, as you well know. In some unions, elections have not been held in five years, and often no CPA audits of union funds have been taken for an even longer time.

"Business remains relatively free because it has recognized the inherent dangers of governmental encroachment, and has had the gumption to sit up and fight back against further intervention.

Agree to disagree

"The federal government today has reached a point where it must be stopped. And we must not hesitate to speak up on those issues which affect us. Individual endeavor is what our country was founded upon, and we must preserve that climate," Johnston emphasized.

He concluded: "America has a rendezvous with destiny, and you and I must not be late for that appointment!"

Norvell Ogden, of Power Electric Co., Jackson, Miss., Third Dis-

From left to right are Carl L. Teal, Third District vice-president; Chuck Hart, NECA national office, Washington, D. C.; Bill Damon, NECA national office, Washington, D. C.; Paul Geary, executive vice-president, NECA national office, Washington, D. C.; and Don Clayton, Sr., past-president of NECA and 3rd District governor, Birmingham.

From left to right are Richard Smouse, manager Virginia Chapter, NECA, Richmond; Dwight Casey, manager, Carolinas Chapter, NECA, Charlotte, N. C.; Norvell Ogden, Third District NECA member, Business Development Committee, Jackson, Miss.; and Charles Thurber, Third District Regional Director, Atlanta.

From left to right are J. M. Murphy, president, Virginia Chapter, NECA, Roanoke; Carl L. Teal, vice-president, NECA, Birmingham; Charles W. Moseley, vice-president, Southeastern Line Constructors, Charlotte, N. C.; Don B. Clayton, Sr., NECA past-president and Third District Board of Governors member, Birmingham.

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there was a time when a boxful of spaghetti wiring and a jumble of literally "shocking" fuse blocks was called a panelboard. Few folks still think there's a reason for such equipment.

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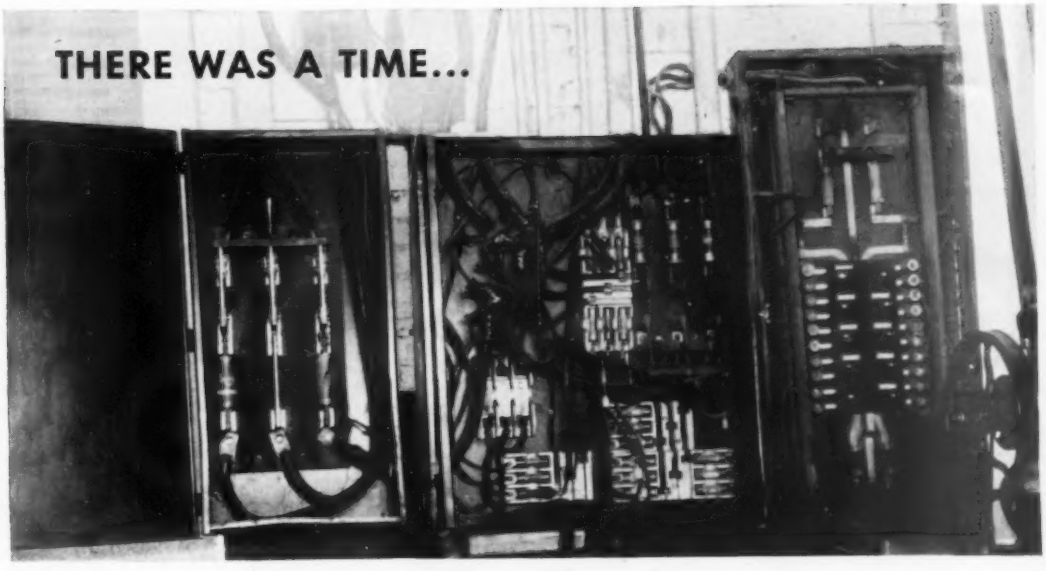
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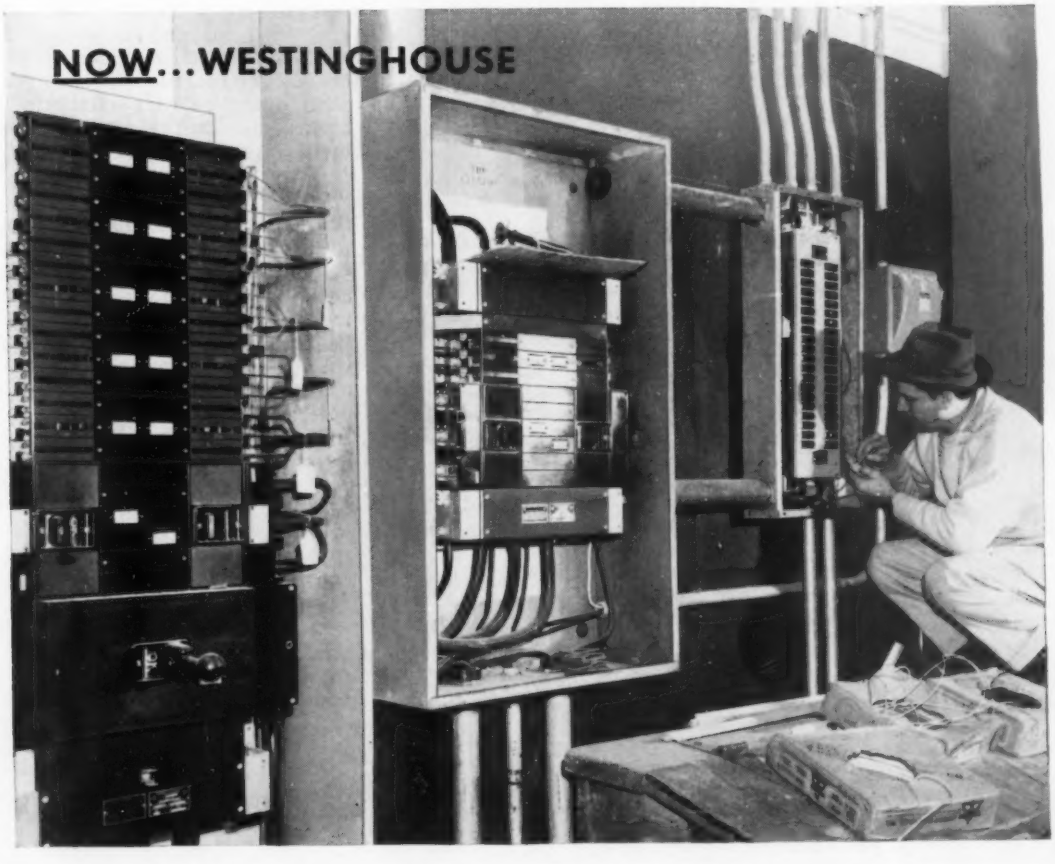
NOW...WESTINGHOUSE

Participating in the popular panel discussion on public relations were Charles W. Moseley, Charlotte, moderator; Don Clayton, Sr., Birmingham; James Stansell, Nashville; Ralph K. Robinson, Charlotte, and Ben Waters, Columbus, Ga.

Another panel discussion, on the subject of technical and training service, included James Dandelake, moderator; Irving Tuck, Norfolk, Va.; Howard Pancost, High Point, N. C.; Elwood Peele, Burlington, N. C.; and Ken Maddos, NECA national office, Washington, D. C.

trict member on NECA's Business Development Committee, reviewed in detail the marketing service provided by NECA, which, he explained, gives specific aids to electrical contractors as a group on selling services and obtaining business that can be done at a profit. "It involves not only selling and advertising, but also market research and relationships with those influence factors that have so much to do with whether the contract is sweet or sour."

Ogden continued:

"In a very general way, we can compare the function and objectives of the Public Relations Service and the Marketing Service thus: Public Relations sets the climate for doing business; Marketing moves in for the order.

"There are six major elements of the NECA marketing Service: (1) Institutional advertising; (2) marketing research; (3) personal contact with industry customers; (4) relations with suppliers; (5) relations with architects, engineers, and builders; and (6) adequate wiring.

"Each of these elements are under constant study by the NECA Business Development Committee which is composed of a chairman, Arthur E. Bertke of Cincinnati, and a member from each of the Nine Vice-Presidential Districts, and the Secretary. I am the member from the Third District.

Objective development

"This Committee is concerned primarily with expanding the opportunities for electrical contractors to do a profitable business. To this end, it develops objectives and programs with the secretary acting in the capacity of program director and adviser. The Committee recommends programs for adoption. Such programs may involve, but are not limited to, national advertising, aids for chapter promotions, and for individual member use, sales techniques and instructions, cooperation with other branches of the industry, including joint promotional efforts, and to improve relations with suppliers, to the end that manufacturers will be induced to make better use in the public interest of the services of the qualified electrical contractor in the distribution pattern," Ogden emphasized.

He went on to say that the general nature of NECA's Market Service has been quite well-defined by the National Committee. "Now under preparation for circulation among Committee members this summer is an outline of a basic plan for the stable growth of the electrical contracting industry. This plan merely sets down on paper for continuing review and study the principal objectives of the Marketing Service and suggests how these can best be obtained."

Ogden continued: "Our big problem is whether in this rapidly expanding electrical market, the contracting function will keep pace with other industry elements in ability and facility to serve adequately the American people.

Profit through selling

"The Committee believes that the most valuable result of this project will be the dependable counsel it could provide to assist individual contracting organizations. Hundreds of contractors, who in prior years seldom, if ever, attempted to build their business by real selling, are doing so today. A considerable number—though few compared to the total number of contractors—are making some use of one or more NECA Marketing Services. But by and large, only a handful are taking full advantage and reaping the benefit," Ogden said.

He explained that a primary purpose of the NECA district meeting is to bring to the attention of members what values their association offers and to suggest how they can be turned into benefits. "Marketing is peculiarly a local operation. The Marketing Service must be understood by each member in each chapter and it must be adapted locally to a specific use. That is why it is very important that each chapter have a local committee headed by an alert and aggressive chairman who will un-

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HI-OUTPUT "D-8500" LINE FIXTURES by Wheeler—designed for use with 100 watt and 60 watt rapid start lamps operating at 800 MA.

Diffuser apertures provide a small upward component of light to relieve severe brightness contrast . . . and allow for heat dissipation.

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dertake this responsibility and make it click.

"We have reached the stage where the primary task of such a committee is to put a program into action and we cannot stress too strongly the imperative need for chapter attention to this matter. If you do not have such a chapter committee set up, we urge you to do it promptly and advise the district member on the national Business Development Committee and the national committee secretary the name of the chairman. We need this local network to help do this job," Ogden reiterated.

"Market research provides the eyes with which business can see. It is a primary and very basic first step to any marketing program. It is something very difficult, if not impossible, for the small businessman to undertake. It is a service that your trade association can do and do well. It is an important function of NECA and will be increasingly so in the months ahead. . . .

"This year, the Committee is providing for one group of important industry customers, top private utility management, a sales presentation tailored to their need. It is suitable for giving to top utility managers by the NECA field representative, the chapter manager, or local committee of contractors," continued Ogden.

"One of the fields that the qualified contractor is not filling properly is that of modernization, particularly home modernization. This is a field that must be developed by the contractor by his own sales initiative. It is not suited to bidding, for it demands the full resources of the contractor—engineering as well as installation. Thus, the overhead costs necessarily are high. The curbstoner who tells a customer he can do this kind of work cheaper because he has no overhead is robbing himself and kidding the customer. The sales costs for this type of work are very high compared to sales cost on most other kinds of electrical contracting services.

"In other words, a successful home modernization contractor is likely to be a more aggressive, versatile, and progressive businessman than some of his contemporaries. He soon reasons that over in the competitively bid commercial and industrial field, the jobs are bigger, easier to manage, and he has no sales expense to speak of. So he moves over into the commercial and industrial field, and the qualified NECA contractor wakes up to find a new competitor in bed with him. This makes for much unhappiness.

Use of ingenuity

"A suggestion has been made that in those cities and areas where present NECA contractors are not doing any appreciable amount of the modernization work, that some of the more affluent line, industrial, and commercial contractors subscribe to stock in a specially-organized service company which would engage exclusively in the small work field. It would have a competent professional management, a sales force, proper equipment, stocks of materials and stock or access to appliances for specification use on package jobs and a repair shop for all manner of electrical appliances and gadgets. It would be a complete electrical service center.

"The virtue in this proposal is that the ownership could properly keep this type of business put in the improperly-manned small work field, so that it would develop proficiency and a profitable business.

"There are, of course, cities and areas where one or more qualified NECA members are filling this need quite well. This suggestion was not advanced to create competition for them. It is intended as a special plan for special conditions. No one knows whether such a plan would work. It needs some substantial planning and solid testing. Here again, is a problem that presents itself to the market research activities of NECA. An ideal way would be for a group to start such a pilot project in some area. It might be that NECA could properly observe the operation closely, provide the services of a management consultant to analyze the operation and then present a clinical study to the industry for whatever use might be made of it.

"A lot of work would have to go into such a plan. Much of this work would be concerned with finding efficiencies in organization, operation, and procedures. We would have to know the current selling cost; the current layout, and estimate costs; the current installation costs; what are inventory, operating, and overhead costs; what are the labor costs; the cost comparisons of various installation methods; what would be the capital investments required in this business; and what should be typical investment returns.

"It should be clearly understood that this is not a specific plan being offered or promoted by the Business Development Committee. It represents a suggestion, based on long and varied experiences of a number of practical contractors. It merits full discussion here. It is hoped that from these discussions at district meetings that one or more pilot operation can be started very soon," Ogden declared.

Wide spread bid factors

Factors that create such a wide spread in electrical bids are poor planning, poor specifications, and lack of understanding on the part of the architect and engineer, he said. They are prime influence factors in an electrical contractor's business. It behooves the electrical contractors to keep in close touch with them, cultivate their friendship and trust and offer them assistance.

"This is a job that must be done almost exclusively locally. Some chapters have been successful in accomplishing effective contact through regular meetings with architects and engineers. Case data and experiences in this area are being collected by NECA with the view of presenting the membership with a special manual on promoting better relations with the architect," he said.

Progress apparent

NECA Regional Director Charles S. Thurber then gave the annual District report, indicating that considerable progress had been made in all aspects of membership activities, particularly during the past two years.

A meeting of the Southeastern Line Constructors, in the absence of SLC President John Seabrook, of Charleston, was presided over by SLC Vice-President Charles Bolling of Nashville, Tenn.

The meeting generated heated discussion on such topics as the apprenticeship program and appointment of a labor-management liaison committee to formulate it, recent union practices of questionable nature, together with consideration about intersection lighting on the new cross-country super highway system, with the official request by those present that Regional Director Thurber contact the American Roadbuilding As-

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sociation to determine position of the electrical contractor in the approaching program. Discussion also ensued relative to the laying of the oil static cable, with respect to which category—the general or electric contractor—the job should rightfully fall.

Public relations aspects

Following the traditional Governor's breakfast, the second day's general meeting got under way with panel discussions on NECA's public relations and technical and training services.

The public relations panel was moderated by Southeastern Line Construction Vice-President Charles W. Moseley, of R. H. Bouligny, Inc., Charlotte, N. C. Moseley's panelists were all Third District governors, including NECA Past President Don B. Clayton, Sr., Birmingham, Ala.; James N. Stansell, Stansell Electric Co., Inc., Nashville, Tenn.; Ben P. Waters, White Electrical Construction Co., Columbus, Ga.; and Ralph K. Robinson, Robinson Electric Co., Charlotte, N. C.

Mr. Clayton discussed aspects of legislation and liaison with government agencies affecting NECA members nationally. He emphasized that HR 3340 (also HR 7168) had been favorably acted on by the House Judiciary Committee, and conceivably could be ordered out for a vote by the Rules Committee within the next few weeks.

Said Clayton: "This legislation, with the cooperation of general contractors, can do much to eliminate bid-shopping and bid-peddling."

NECA Executive Vice-President Geary announced from the floor that the present bill pending in Congress, ready to be reported out by the Rules Committee, was actually HR 7168, which also would serve to modernize practices in contracting for Government work.

Mr. Stansell discussed existing publications issued by the NECA national office and encouraged members' greater interest therein.

NECA representation on business and industrial councils was the public relation topic handled by Mr. Waters, while Mr. Robinson commented on NECA's interest in greater promotion of fair trade practices, along with the AGC.

Conducting the round-table discussion on technical and training services afforded by NECA were Washington Specialists Hart and Maddox, with a panel comprised of Governor James Dandelake, Miller Electric Co., Jacksonville, Fla., who served as moderator; Elwood Peele, Peele Electric Co., Burlington, N. C.; Howard Pancost, Bryant Electric Co., High Point, N. C.; and Irving Tuck, Jr., Tuck & Kendall, Inc., Norfolk, Va.

Discussion mainly revolved around the market for commercial and institutional electrical construction, which, with a slide presentation, was entertainingly explained by Hart.

Expression of optimism

Hart commented: "Why does this commercial and institutional sales outlook for power and electrical construction appear so optimistic? Well, for many reasons.

"People—every week about 56 thousand more added to our economy—29 million added in the last 10 years—and the rate of growth is actually increasing.

"Prosperity—the most prosperous consumers in history—more than 4 out of 10 families make over $5,000 a year—since 1950 the number making between 5 and 10 thousand has doubled—nearly one out of 10 make over 10 thousand.

"What effect has this great increase in people already had on our economy?

"Well, for example, in the last 10 years, the consumer built and bought over 10½ million new homes, purchased 42 million new cars, went on a buying spree to the tune of over 2-trillion dollars, and increased gross national product from $278 billion in 1946 to $412 billion in 1956.

"These are impressive figures—and the future looks even better. In short, the commercial, institutional, and industrial electrical construction market can be built on the most prosperous, productive economic base this country has ever known.

"The amount of electrical construction that will be performed depends on the present-day electrical contractors—it can be a healthy or poor one, based upon going after and selling the commercial, institutional, and industrial modernization electrical wiring market," explained Hart.

"And what is the market for electrical wiring construction in this field for the next ten years? Well, 22½-billion dollars is an ultra conservative estimate.

"New construction may taper-off in 1957 and 1958, primarily because of the tight money market. Normally, this would seriously affect sales of electrical wiring. But something else will take up the slack. And that's modernization. Most small businesses this year, and many large ones, are not able to get enough money to expand or build new facilities. So they are staying put, keeping what they have and fixing it up. This trend to modernization is creating a vast new market—one which the electrical industry is in a position to get a piece of. . . .

"Historically, lighting has been brought up to date about every 10 to 15 years. And each time this modernization took place, the previous lighting value was about doubled. Introduction of the highly-efficient fluorescent lamp slowed this trend down a bit back in 1940, at least as far as wiring needs were concerned. But the trend today is actually to supplement fluorescent with more and more incandescent lamps. Therefore, today's wiring should be designed and built to provide for at least future lighting increase," Hart declared.

Competition a factor

Hart pointed out that competition is another factor in today's economy that is giving impetus to the trend to electrical applications in retail stores.

Most merchants, he said, recognize the drawing power of a well-lighted and comfortable air-conditioned store. Most of them know that to remain competitive they must have these things. If they don't, they soon learn when they lose business to the fellow down the street who does. "In San Antonio, Texas, they didn't stop with just air conditioning the store. No, they air conditioned the sidewalk, too. The shopping facilities are similar to the old open-air bazaars and shoppers wander from shop to shop. So they just roofed over the sidewalk and enclosed it with glass panels. Air conditioning units keep shoppers comfortable and the open door policy brings them in. This kind of application may have limited use, but it does illustrate how a little imaginative selling can make modernization pay off in more electric revenue and wiring profits.

"But don't let me mislead you," he warned. "In spite of a few

(Continued on page 116)

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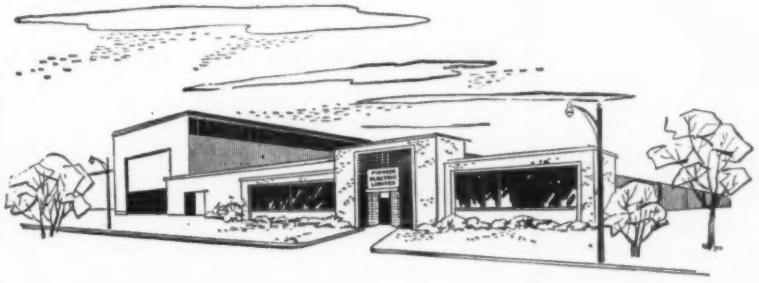

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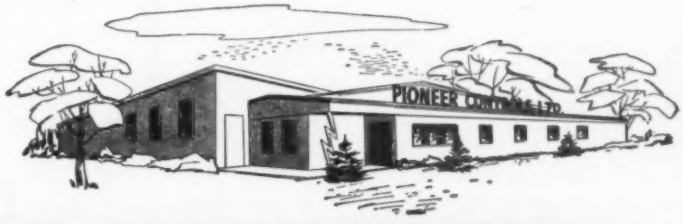

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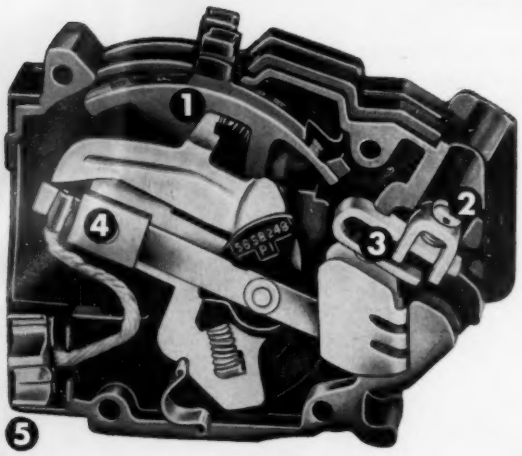
New! General Electric "twin" breaker slashes costs,

Now get more circuits per load save up to 25% in equipment

Put two breakers into the same space as a regular 1-inch breaker



More built-in durability with new "twin" construction. Each pole is rated 15 or 20 amperes.

1. "Protection plus" with free floating handle. Positive control of arc direction protects the hand, prevents breaker damage.
2. No stripped threads. Steel lugs on all terminals. Threads can't be stripped, grip like a bear trap.
3. Cool, safe operation with silver-plated current carrying parts. Contacts "wipe" against each other, stay clean for longer life.
4. High-torque magnetic action. Thermal magnetic trips provide greater circuit protection, positive separation of contacts.
5. Easier, quicker breaker connections. Protected self-aligning stab receptacle is spring reinforced—can't bend, plugs in without jiggling, grips tightly.

Now you can put more circuits into a smaller load center, because the new General Electric "twin" has two rugged breakers in a one-inch case! And because new G-E load centers are sequenced-phased, you can use "twins" and regular 1-, 2-, and 3-pole breakers in almost any combination. That means you can use smaller, less costly load centers than ever before possible. Here is a typical case:

Here's how you save . . .

For a 14-circuit installation requiring

. . . one 50-ampere 2-pole breaker
. . . one 15-ampere 2-pole breaker
. . . one 20-ampere 2-pole breaker
. . . eight 15- or 20-ampere single-pole breakers

Buy G-E's 8-circuit load center (TRP810S)	@	$10.40*	$10.40
Buy 6 "twin" breakers	@	5.60*	33.60
Buy 2 Type R breakers	@	2.80*	5.60
Total cost			$49.60
Lowest previous cost (20-circuit box plus breakers)			$65.20

*List Price

You save $15.60

This is just one example of the many jobs on which you can cut equipment costs. See your General Electric Distributor now. Be sure you've got your next job figured the new "twin" breaker way.

Progress Is Our Most Important Product

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doubles circuit capacity of new G-E load centers.

center, costs

New load centers slash installation and wiring time up to 20%

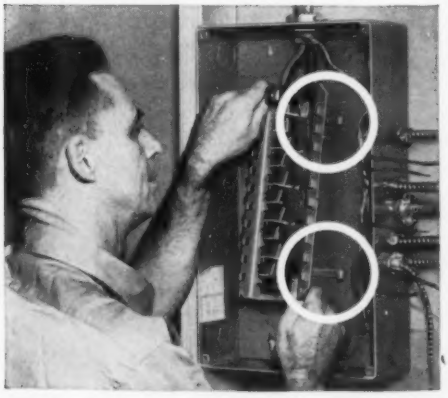
Save costly cable. Boxes and interior mount either-side-up to meet line wire positions.

Avoid skinned knuckles. Interior "snaps" in and out in seconds, giving plenty of room to swing a hammer or pull wires—inside the box.

Mount box fronts fast. Fronts hook on like a picture, lock with just two captive screws.

Enjoy automatic front alignment. Spring-mounted, snap-out interior "gives" with pressure, levels breakers automatically—even when box is off plumb.

These contractor shortcuts will save you 20 per cent in job time, as proved by actual contractor tests.



Interior "snaps" in and out in seconds for full wiring room. Interior mounts on springs, "gives" with pressure, automatically lines up breakers with front even when box is off plumb.

From 40 to 200 amperes, from 2 to 40 circuits G-E's 45 new load centers will cover every job. Have your G-E distributor show you the new load centers and the "twin" breaker. See for yourself how to get more quality circuit breakers into a smaller load center, in more circuit combinations, at the lowest cost. *General Electric Company, Circuit Protective Devices Department, Plainville, Conn.*

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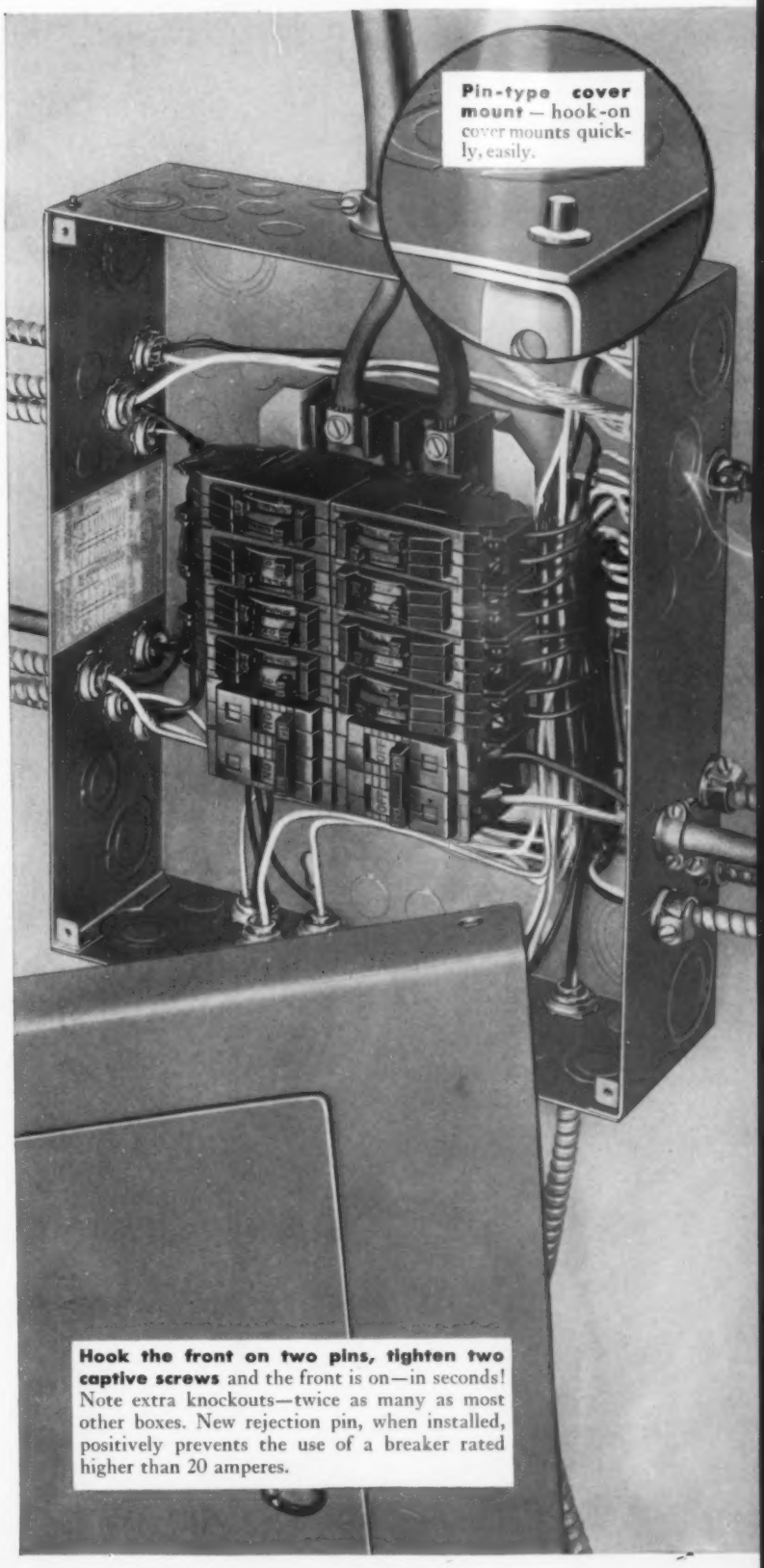
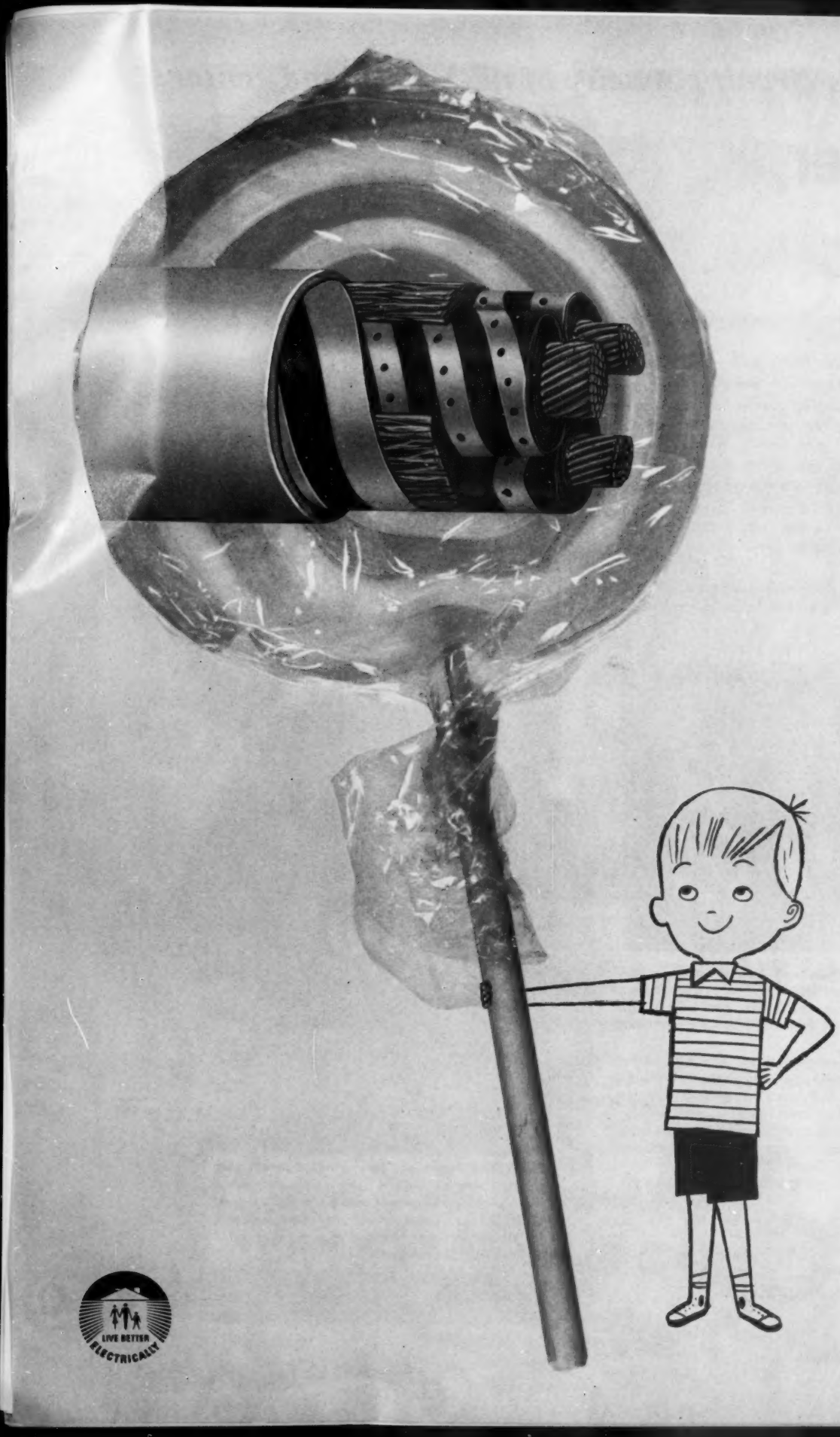


Hook the front on two pins, tighten two captive screws and the front is on—in seconds! Note extra knockouts—twice as many as most other boxes. New rejection pin, when installed, positively prevents the use of a breaker rated higher than 20 amperes.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Roebling Tellurium Lead Alloy Sheath was developed *specifically* to meet the greater stress requirements of today's high loadings and increased operating temperatures.

And it does just that, with its—

4½ Times Greater Bending Fatigue Resistance over ordinary sheath, even in small bending radii.

Remarkable Creep Resistance—actually creeps 90% *less* than ordinary sheathing!

Outstanding Heat Stability—no change in structure or properties after treatment at 400° F.

Negligible Age Hardening—stays "young," ductile, for years.

Resistance to Vibration Fatigue—withstands punishing road vibrations.

Combine these features with superior quality *Roebling Paper Power Cable*, and you can see why more and more companies look to Roebling for cable that lasts . . . and lasts!

Interesting technical data regarding the special properties of cost-saving Roebling Paper Power Cable with Tellurium Lead Alloy Sheath are available from Electrical Wire Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.

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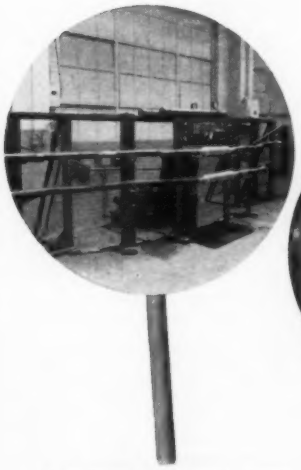
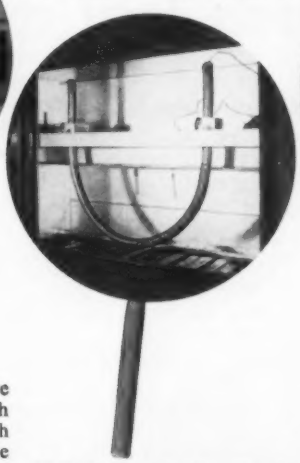
Roebling Paper Power Cable with Tellurium Lead Alloy Sheath is available with either copper or aluminum conductors.

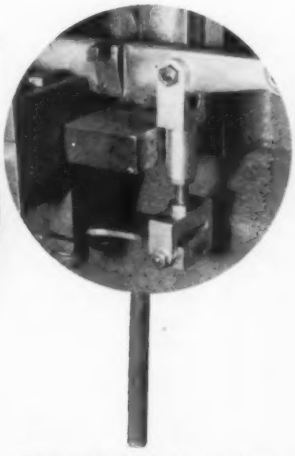


Accelerated life tests prove Tellurium Lead Alloy Sheath far exceeds ordinary sheath in standing everyday cable stresses.

INTENSIVE TESTS PROVE UNUSUAL SERVICE QUALITIES



Tellurium Lead Alloy Sheath takes 4¼ times more bending than copper lead alloy sheath under identical test.



Roebling Tellurium Lead Alloy Sheath shows its long-term resistance to effects of road vibration in a high-frequency test machine.

Roebling Tellurium Lead Alloy Sheath has 90% less creep than ordinary sheath as proved over extended periods in test ovens.

Contractors tell how

Their improved floodlighting benefits filling stations

By E. E. Turner, Jr.
Electrical Contractor
Turner Electric Co.
Knoxville, Tenn.

◆ TURNER ELECTRIC CO., Knoxville, Tennessee, is operated by E. E. Turner, Sr., and myself. For a good many years, we have specialized in electrical work for filling stations and bulk plants. During this time, we have always been seeking a better method of floodlighting for stations, inasmuch as they are in a very competitive field and need constantly to progress to keep pace with their competition.

The problem is really two-fold:

(1) To increase the lighting equipment to a higher efficiency. This equipment is paid for by the oil companies.

(2) To keep down the operating cost, which is paid for by the operator in light bills. This is very important because if the bill is too high, the operator will fail to utilize all of his equipment.

We believe we have solved both of these problems to a great extent by our application of mercury-vapor floodlighting on station driveways.

For example, in cooperation with Phil Jones, the local Pan-American distributor, we installed for them on their newest station four 700-watt mercury-vapor units for a total of 2800 watts, replacing a conventional incandescent load of approximately 3600 watts, and increased their light coverage about 40 per cent while actually reducing their billing load.

This situation has been repeated on numerous stations in our area, with the same results, which have been highly satisfactory to everybody concerned.

One great advantage, we find, is the long lamp life of the mercury-vapor lamp, which goes for years without replacing. We feel this eventually amortizes the original cost. Some of our installations are over two years old without burnouts.

We use heavy-duty enclosed reflectors, aerial ballast, and color-corrected lamps to dispel the blue cast; and get good results by mixing fluorescent island lights for a standout appearance, and to concentrate light on the gas pumps.

Heavy-duty reflectors are essential to transmit heat from the lamp and to keep out moisture. Proper height is important. We don't recommend break-down poles, due to the weight involved and to eliminate attempted service by unskilled personnel.

E. E. Turner, Jr., of Turner Electric Co., Knoxville, Tenn., has solved gas station floodlighting problems largely by use of mercury-vapor lamps, such as the one he is holding. His plan has increased station light coverage, while cutting the billing load for station operators.

He suggests local credit service

By Gerson Maisel
Contractor
Maisel Electric Co.
Washington, D. C.

◆ I THINK THAT IT would be very helpful if local electrical contractors' associations were set up to give credit clearance on customers applying to electrical contractors to take on their wiring jobs.

We contractors are all so eager to take on jobs that builders and building contractors bring us that we go to work without looking into their credit. Once our jobs have been completed, it may be very difficult for us to collect. In our repeated efforts to get payment, we learn that these builders and contractors have given other electrical contractors similar experience. They, too, have never been able to collect, and refused to do further work for such poor risks. And so these builders turn from one electrical contractor to another, getting their work done free, with potential victims ahead, unaware of the situation until they have been "taken."

It is an expensive undertaking for many of us to join local credit bureaus in order to get credit clearance on people before the

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GREENLEE 884 POWER BENDER

quickly makes full 90° bend

in 4″ conduit with one ram stroke

now – a fast, lightweight hydraulic bender that handles 10 conduit sizes from ½″ through 4″. . . combines the speed and power, the wide conduit size range, and the complete ease of operation that so many contractors have been asking for.

It's fast: Put a GREENLEE No. 884 Hydraulic Power Bender on your conduit jobs and see how much quicker they go. Make a perfect 90° bend *with only one shot* . . . even in big 4″ conduit, which takes only 4 minutes when your No. 884 Bender is operated with the No. 798-AC Power Pump shown above. (Same job even faster — only 30 seconds — with the larger GREENLEE No. 797-E Power Pump.)

It's extra powerful: Forty tons of ram pressure for easy bending of *any* of these sizes of pipe or conduit — ½″, ¾″, 1″, 1¼″, 1½″, 2″, 2½″, 3″, 3½″, 4″. And *one set* of pipe supports accommodates all 10 sizes.

It's lightweight: High-strength aluminum alloy extensively used to hold weight to a minimum. Easily portable, one-man-operated. And you can use this powerful bender in any position!

It's a timesaver and a money-maker for you: Eliminates need for costly manufactured bends and fittings . . . cuts job time to a fraction. Pays for itself over and over again.

fast, easy insertion and removal of conduit at front of bender

Frame stays in one piece at all times — just slip conduit in or out *at the front*. Pipe removal pin expedites unloading of work. Positive-locking pipe support pins can't come loose during bending . . . simply turn "T-lever" to quickly lock or unlock pin.

portable, versatile

The new GREENLEE No. 884 Lightweight Hydraulic Power Bender is easily wheeled from one location to another with its pipe supports serving as rollers. Lets you make your conduit bends exactly where and when needed . . . in all 10 sizes from ½″ through 4″.

SEE YOUR ELECTRICAL DISTRIBUTOR for complete details on this timesaving new GREENLEE No. 884 Hydraulic Power Bender for conduit up *through* 4″, or write for illustrated bulletin No. E-224.

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mischief has been done. Apparently nothing will stop such unscrupulous builders who capitalize on over-eager contractors. As an added protection and service, I would like to see our electrical contractors association set up a service to provide credit clearance.

One-ticket-at-a-time method is time and money saver

By S. W. Ellis
Little Rock, Ark.

◆ WHEN A LARGE volume of electrical repairs made time-saving a necessity to insure profits, the Houston Electric Co., Little Rock, Ark., initiated a plan of handling work tickets that is proving successful.

Each morning, the electrician in charge of one of three completely-equipped job trucks is given a single work ticket to start his first assignment of the day. After finishing this work, he telephones in for the next job. Owner Delton Houston, catching most of the calls, then gives the electrician a second job, close to the truck location. The electrician makes complete notes in a small job book he carries. When he goes back to the shop at noon or at the end of the day, he makes up his own work tickets from his notes.

Houston planned his itemized job sheets to suit his own operation. On one side, the ticket provides space for date, customer's name and address, and description of job, followed by the electrician's name and the hours consumed in the work. The other side of the ticket is for materials used on the job and for miscellaneous charges, including city permit.

Houston reveals why he initiated the one-ticket-at-a-time plan. "When I formerly gave each man a number of job tickets at one time, I did not hear from him all day. I found this a poor way to make profits from repairs and to serve a large and growing volume of customers. Now the men are conscious of the time check that the one ticket makes possible, and they cooperate fully. Truck mileage is saved, the men can handle more work, and we realize more profits."

Another advantage of the system is that quicker service is given to the smaller repair jobs, on which Houston has a reputation for giving fast service. The one-work-ticket-at-a-time method, according to Houston, has an important place in his well-calculated plan to build volume and profits from repair service on residential wiring.

Follow-up awards profitable service jobs

By E. H. Woestendiek
Vice-President
Hampton Electric Co.
St. Louis, Mo.

◆ WE CAN ALMOST reverse the old axiom, "Take care of the little things and the big things will take care of themselves," because we use special methods and supervision to take care of the big and medium jobs. Thus we find that our methods are generating service business, as well as repeat business of all kinds.

We have always been concerned about the customer, and have studied ways of maintaining the personal touch as our business has grown bigger.

We have also been much concerned about the tendency of skilled electricians to specialize to the extent that a man might be sent on a job which he couldn't do because of his specialized training.

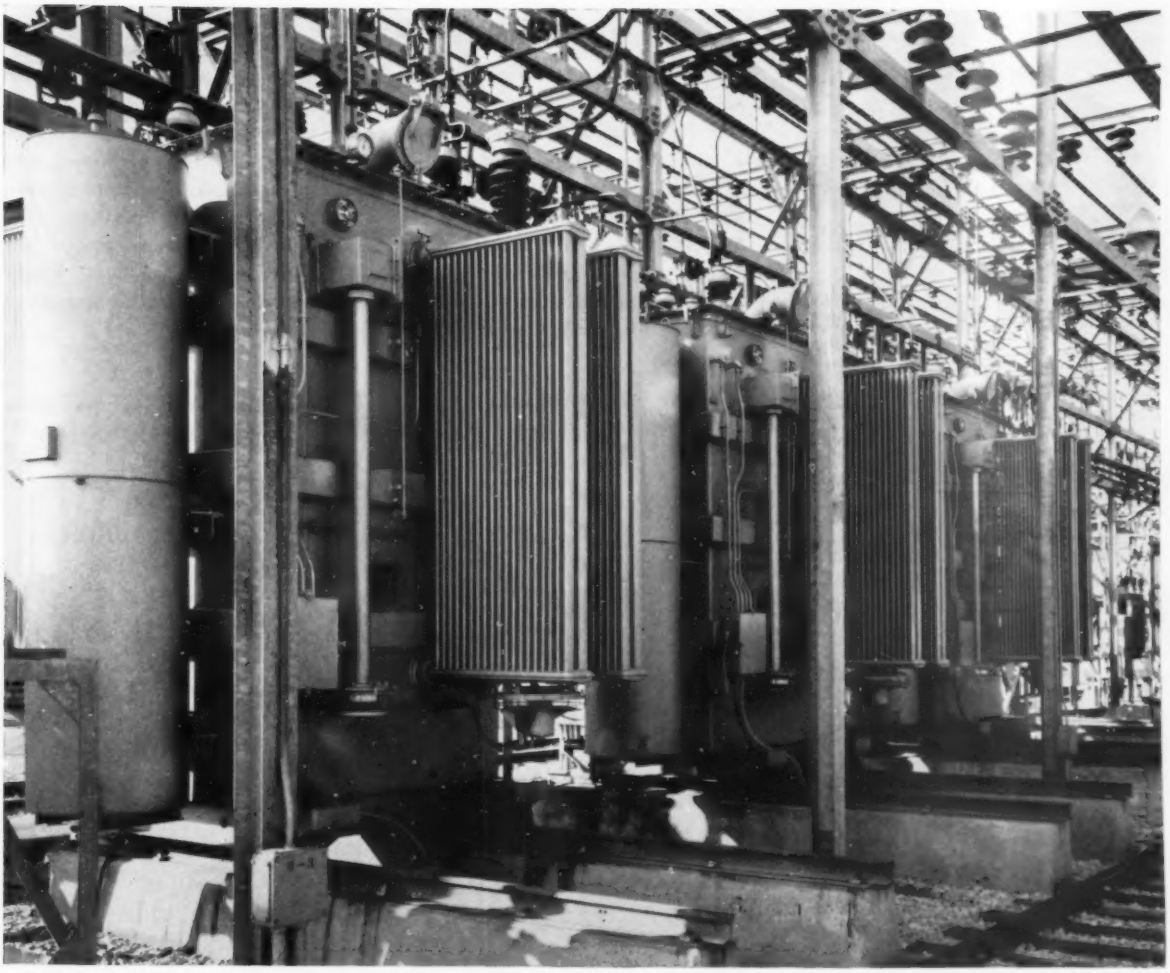
So our supervision plan has capitalized on the bent of our men for specialization, and we have kept in touch with the customer at the same time. In solving these problems we gained business and made friends for all our other departments.

Vice-President E. H. Woestendiek of the Hampton Electric Co., St. Louis, Mo., vouches for the "follow-up" method to build goodwill, repeat business.

We like to have one of our estimators make an estimate on all jobs that rank higher than installing extra receptacles because it is good business. The customer knows what the job is going to cost, and we know what work we will have to do.

After an estimator has filled out an estimate blank, it goes to the superintendent of one of our crews. We have a considerable number of crews, each ranging from eight to 20 men. Each superintendent knows each man's specialty and sends out men who can use their highest skill and thus do the best job.

Each job is checked about the time of completion and a final contact made with the customer before the job is billed. The estimator or other authorized person makes the return call, checks the actual work, and, if our workman has made a mistake, corrects it. Incidentally, if this were not done, a



KUHLMAN "Salesman of the Week"

If you can identify this Kuhlman representative, and are the first one to notify Dept. SA-1, Kuhlman Electric Co., Bay City, Mich., you will receive a valuable gift.

"More power! More Kuhlman! —for Memphis . . ."

"The far-sighted planning of Memphis, Tenn., is a model for all the booming South . . . take the story of Substation 11 (shown above) for example:

> "Last year, 6 Kuhlman 3333 KVA power transformers had been satisfactorily carrying an increasing load. However, Memphis Light, Gas & Water's division engineers—carefully appraising the movement of new industry into Memphis and projecting this trend into the future—decided to install 6 new Kuhlman 5000 KVA units. The result . . . more reserve output for the present—flexibility for the future.

"This confidence that growing Memphis places in Kuhlman dependability has been won by satisfactory performance. Before planning your next expansion move, let your local Kuhlman representative show how our 63 years of experience can profit you."

5715a

KUHLMAN ELECTRIC COMPANY

GENERAL OFFICES: Birmingham, Michigan

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

workman could make the same mistake over and over again. The estimator sees that the owner is satisfied.

The goodwill generated by this system is a tremendous force for good. We've had many comments relayed to us, ranging in praise for keeping the job neat and clean to a statement that the job was more complete than expected from the specifications on the estimate.

Service business is something that cannot be readily solicited, and most of the service orders come in over the phone. Service crews seldom do any work on estimates or have their work checked by a follow-up man. They are the men who repair the toasters, check the fuses, and repair the shorted cords and million-and-one similar things. We have all trained, reliable, and experienced men in these service crews. Most of them have been with us from five to ten years.

Since there is no solicitation of service business, we have found that our supervision and follow-up on larger jobs requiring the estimate routine are responsible for much of our increasing service business, which now requires use of eight service trucks.

By making spot checks, we find that one satisfied customer, impressed by our desire to see a job finished right by sending out a follow-up man, tells a neighbor to call us when asked who to call for repair of an appliance. Checking our orders, we find that we get many calls from customers of several years back, who had bigger jobs at that time.

So we are more than ever impressed with the importance of taking care of the medium and big job in such a way that it will generate repeat business, goodwill, and the desire to recommend us when the opportunity is present.

Contractor defines advertising objectives

◆ NORVELL OGDEN, president of the Power Electric Company, Jackson, Mississippi, in an address before the Advertising Club of his state, said in connection with the progress of his own company, "We have to go out to the customer with a sales story. There is no more telephone order solicitation today."

Speaking on three important

(Continued on page 104)

Contractors cooperate in 'fair' promotion

The quarter-page newspaper advertisement, shown above, demonstrates how nine New Orleans electrical contractors recently tied-in with an electrical wholesaler and a manufacturer to conduct a "Lighting Fixture Fair." Approximately 3,000 builders, architects, electrical engineers, and industrial representatives from Southern Louisiana and Southern Mississippi were invited. The fair featured the recently-completed display facilities of the Interstate Electric Co., of New Orleans. Interstate's display rooms are said to contain 5,000 ceiling square feet, where $50,000 of lighted fixtures, in true "super-market" fashion, are displayed for electrical contractors and customers.

PUBLIC INVITED! FREE ADMISSION!
LIGHTING FIXTURE FAIR
TIME: 9 a.m. to 5 p.m. Sat. April 27
Learn Modern Living with Modern Lighting!
PLACE: INTERSTATE ELECTRIC COMPANY
Be our guest. Help us celebrate our 53rd Anniversary and our First Annual Lighting Style Show. See the South's largest "great white way" of lighted fixtures . . . hundreds upon hundreds . . . showing the wonderful new things and ideas happening in the world of Light for the home.
There is no place in the South where the home maker and her contractor can have such a selection of fixtures by Lightolier, America's foremost designers and producers of lighting equipment! Our gigantic display rooms of 5000 ceiling square feet and $50,000.00 of lighted displays is truly an "electrical super-market" where electrical contractors and their customers can shop and get anything they want in lighting immediately!
Plenty of Free Parking
Make Plans Now and Don't Miss This Spectacle
Interstate ELECTRIC Co.
3733 CONTI ST.
Phone AM 3733
Faster Service . . . More Convenience
These New Orleans Electrical Contractors are Cooperating in this Lighting Fixture Fair
★ X. L. BROWN ELECTRIC CO. 1766 Burbank St. EV 3333
★ CHET WHEELER ELECTRIC CO. 207 N. Jeff Davis Pkwy. AM 4190
★ SUBURBAN ELECTRIC CO. 530 Hymes Rd., New Orleans 21, La. VE 3-8058
★ M. CAZAUBON ELECTRIC CO. 1131 Dale Court GA 4330
★ DICKS ELECTRIC CO. 118 Dodge Ave., Metairie, La. TE 5032
★ ARLT BROS. ELECTRIC CO. 7724 Willow St. UN 1-7881
★ BAUDIER ELECTRIC CO. 6559 Memphis St. GA 1581
★ SIGNORELLI ELECTRIC CO. 4401 Calumet St., Metairie, La. VE 3-5848
★ FLASH ELECTRIC CO. 5847 Annunciation St. TW 7-2615

Hell bent for leather

...and going nowhere!

How many contractors today are on this very same treadmill at a time when there's more business around than the industry can properly handle?

Like swimmers battling a tide too strong, they have to keep on hustling just to stay in the same place.

Why? The answer is they're trapped in a vicious circle of cutthroat competition where the harder they scramble, the tighter the profit margins become—until finally, one day, they go out of business.

How To Get Out From Under

Paper and pencil and five minutes of simple arithmetic will uncover these basic economic facts: a slight increase in volume with no increase in overhead means a good increase in profits. Same volume with higher overhead means a sickening drop in profits and eventual bankruptcy.

Moral: learn to "sell up" on jobs to increase volume without overhead.

More and more contractors are slowly but surely discovering that the home rewiring market is made to order for this.

Tired of the lean profits of new construction work, fed up with the bid-peddling that too often turned out to be a losing proposition—these contractors started selling "better electrical living." They found a better rate of profit under less competitive conditions and now they're posting some of the highest profit business on the books.

How To Get Started

Over $10 million in this one year alone is being spent by the industry to promote the modernization market. Here's how you can make this investment pay off in profitable business for you.

Tie in locally with the now-well-known national programs of "HOUSEPOWER" and "LIVE BETTER . . . ELECTRICALLY." They'll make your own advertising and promotion work twice as hard for you.

Continue to sell "better electrical living" at every chance you get in every way you can—through trade and civic associations, through friends, employees, relatives.

And, finally learn to sell the pleasure and convenience of electrical living. Use simple terms, avoid technical jargon. Concentrate on the benefits rather than the involved details of the wiring system—and you'll find plenty of high profit business coming your way.

Published in the interests of the Electrical Industry. Reprints of this message are available by writing to Dept. ESC at:

MURRAY MANUFACTURING CORPORATION

1250 Atlantic Avenue, Brooklyn 16, New York

Murray

Manufacturers of: Safety Switches, Service Entrance and Meter Mounting Equipment, Fuse Panels, Fully Magnetic Circuit Breakers and Load Centers.

THE MOST MODERN DESIGN

This Type LD single-phase transformer—available 250-500 kva, 15 kv and below—improves appearance. Functional, too, this streamlining eliminates external hardware and bracing, aids cleaning and routine maintenance, retards corrosion. Cooling oil is reduced by 35%, transformer weight 27%.

IN SUBSTATION TRANSFORMERS...

NEW

tank, coolers, core, coils; installation area reduced up to 37%, weight cut up to 27%

The latest development in substation distribution, the Westinghouse Type LD transformer, is completely new . . . new base, new bushings, new coolers, new core-and-coil assembly, new tank with exclusive sealing weld at bottom. These features make possible new economies, savings in installation space, maintenance, and inspection.

Longer service life—Low ground capacitance gives more evenly distributed surge voltages—means extra resistance to voltage breakdown. Liberal cooling ducts prevent possibility of hot spots and associated insulation failure. Result—longer coil life.

Smaller, lighter—By preventing abnormally high-voltage stress during surges, Lowgrocap* makes excessively heavy insulation on the coil end turns unnecessary, resulting in smaller, lighter coils. D-shaped cross section of magnetically superior Hipersil® core permits maximum utilization of tank space. Special configuration of wooden end frames with tie rods placed next to core keeps all non-insulating materials away from coil—results in assembly of basically higher insulation strength, and facilitates bringing out both H. V. and L. V. leads.

*Trade-Mark

Less installation area required—Flat, fin-type coolers, more efficient than round tubes, allow placing all cooling on one side only, away from L. V. bushings and cables. Following, are the typical reductions in physical dimensions made possible.

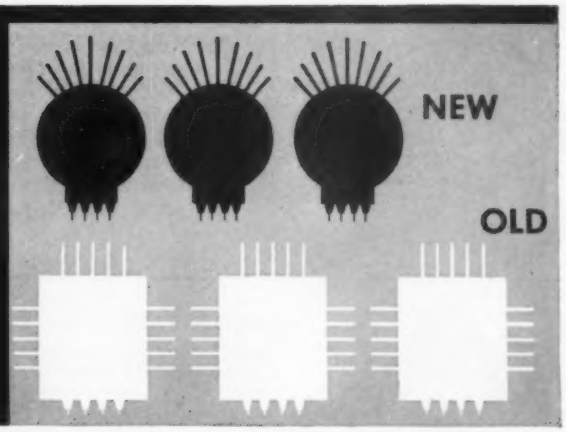
KVA	WIDTH AND BASE AREA REDUCED		HEIGHT REDUCED		WEIGHT REDUCED	
	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
250	15%	21%	10%	17%	23%	27%
333	15%	25%	8%	14%	22%	26%
500	15%	37%	1%	12%	18%	21%

Ease of inspection, maintenance—This modern design with tank weld at bottom permits easier, more complete inspection. Eliminating necessity of disturbing core and coils in simplified untanking procedure minimizes possibility of damage and contamination.

For further information about the new type LD transformer, call your Westinghouse representative . . . or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70817

YOU CAN BE SURE...IF IT'S Westinghouse

New D core with Lowgrocap winding provides compact unit assembly. The outer layer of paper insulating tape on each individual strand of H. V. copper is impregnated with a thermosetting plastic, as is the glass tape banding the coils together. When heated, this bonds the coils into a unit of extraordinary strength. Also clogged cooling ducts are prevented since no varnish treatment is necessary.

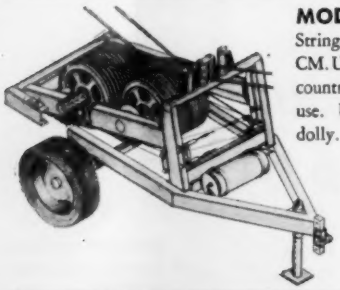


Width of Type LD is up to 37% less than superseded ratings of Type SL transformer—an important cost and spacesaving reduction.

Partial showing of the now ***COMPLETE*** line of . . .

PENGO TENSION WIRE STRINGING EQUIPMENT

Manufactured By* PETERSEN ENGINEERING CO., *Santa Clara, Calif. 14 Patents Pending

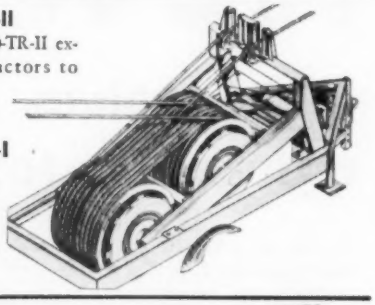


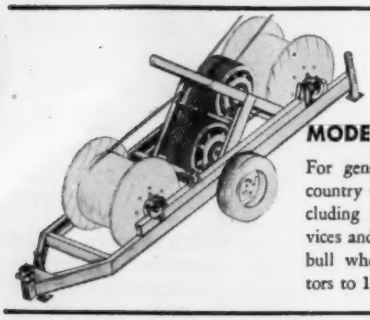
MODEL 5000-TR-II
Strings two conductors to 556,300 CM. Used primarily for very rough country work; also for general use. Use separate reel-carrying dolly.

MODEL 5000-TR-I
Similar except strings one conductor.

MODEL 6000-TR-II
Similar to Model 5000-TR-II except larger. Conductors to 1,272,000 CM.

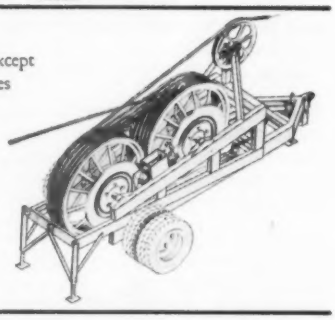
MODEL 6000-TR-I
Similar except for one conductor.

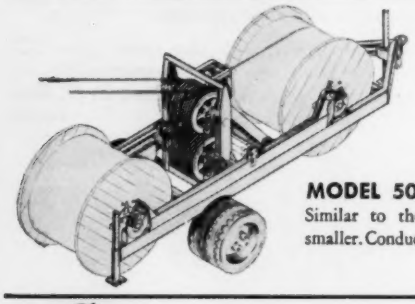




MODEL 6000-WS-TR
For general and medium rough country use. A complete unit including trailer, reel-carrying devices and its own double pair of bull wheels. Conductors to 1,272,000 CM.

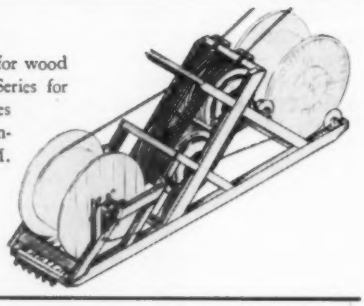
MODEL 7000-TR-I
Similar to model 6000-TR-I except larger. Conductors to 2 inches diameter.

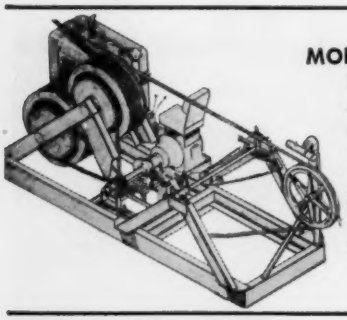




MODEL 5000-WS-TR
Similar to the 6000-WS-TR but smaller. Conductors to 556,300 CM.

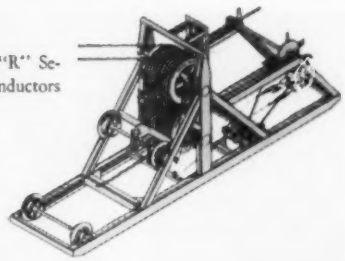
MODEL 6000-W
Available in "S" Series for wood or steel reels, in "R" Series for steel reels, or "SR" Series for trailer mounting. Conductors to 1,272,000 CM.

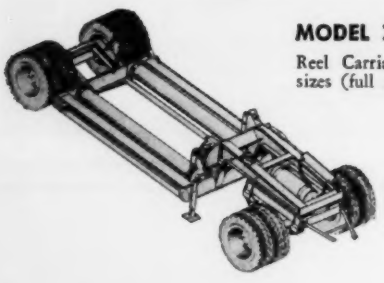




MODEL 6500
Bull Wheel Cable Puller. Available in "R" Series for steel reels, "S" Series for wood reels. Conductors to 1,272,000 CM. Also available in "LWR" Model for extra-large steel reels. Model 5500 similar (smaller).

MODEL 5000-SR
Available in "S" Series, "R" Series, or "SR" Series. Conductors to 556,300 CM.





MODEL 7500
Reel Carrier. Takes the largest sizes (full range) of steel reels. Loads and unloads with one man. No auxiliary equipment needed except the truck that pulls it. For use with any one of the tensioning machines shown on this page.

ADDITIONAL MODELS NOT SHOWN

Tension Reel Trailers

MODELS 2, 3, and 4, Two-Wheel Straddle Dollies not shown. For use with any one of the tensioning machines shown on these pages.

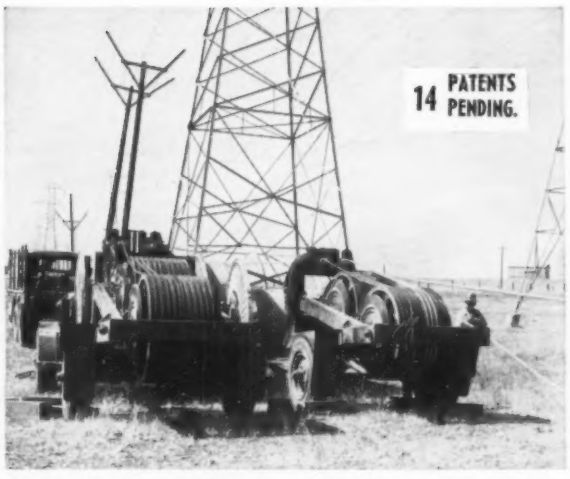
Tension Stringers

MODELS 6000-SK-I and 6000-SK-II For one or two conductors to 1,272,000 CM. Skid mounted for installation on owner's equipment.

MODELS 5000-SK-I and 5000-SK-II Skid mounted for installing on owner's equipment. For stringing one or two conductors to 556,300 CM.

MODEL 5000-WS-III Strings three conductors to 556,300 CM. For mounting on low-bed or full trailer.

MODEL 6000-WS-III Strings three conductors to 1,272,000 CM. For mounting on low-bed or full trailer.



Two PENGO model 6000 TR-II wire tensioners being used by Pacific Gas and Electric Co. in reconductoring job between Vacaville, Calif. and Cottonwood, Calif. 285 miles of 500 MCM copper is being replaced by 954 MCM aluminum in this operation.

Newest method of stringing overhead lines

Two PENGO model 6500 Bullwheel Cable Pullers used by Pacific Gas and Electric Co. for pulling in the new line on the job mentioned above. Unit, manned by an operator and one reel tender, pulls the pulling line (in this instance the old copper conductor) over the double neoprene lined Bullwheels and winds it for shipment in a single operation.

- ***Safest, most economical way of stringing transmission, distribution and even secondary lines.***
- ***Its greatest savings are effected when stringing over and through energized circuits . . . by far the safest, too!***
- ***14 Patents Pending!***

Smooth, postive control of conductor tension can be maintained at all times regardless of model or size of PENGO tensioning equipment used. The large, specially designed PENGO disc brakes are mounted away from the Bullwheels to assure dissipation of the heat generated by the continuous braking action and prevent transmission of the heat to the Bullwheels.

Note the wide range of models on the opposite page available for all types of jobs or terrain and for all sizes of conductor.

List your requirements and send for descriptive literature and prices.

Made by the makers of the World-Famous
PENGO EARTH AUGERS

PETERSEN
ENGINEERING COMPANY
Santa Clara, Calif.

PETERSEN ENGINEERING CO.
Santa Clara, California Dept. 19

Please send me more information on the new Pengo wire stringing equipment.

Name_____

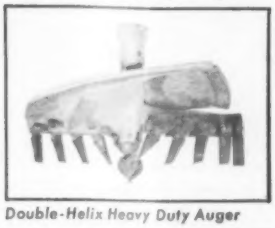
Firm_____

Address_____

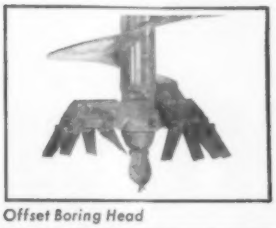
City_____ State_____

Other PENGO Products include:

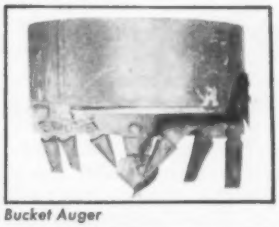
24 inch Heavy Duty Flight Auger



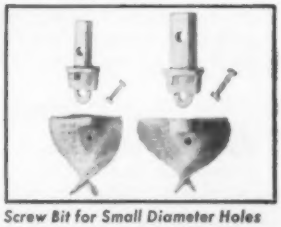
Double-Helix Heavy Duty Auger



Offset Boring Head

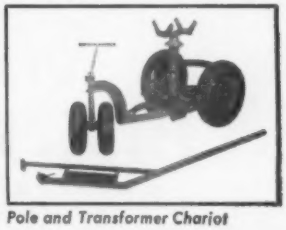


Bucket Auger



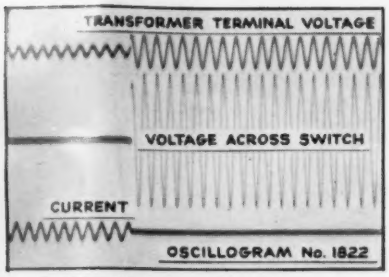
Screw Bit for Small Diameter Holes

Pulling Eye

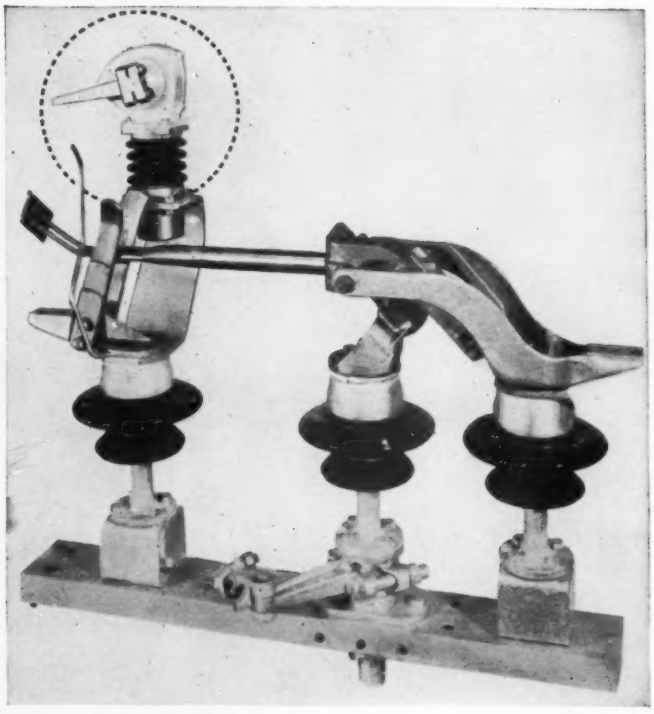


Pole and Transformer Chariot

Powerupter installed on Delta-Star MK-40 Switch—is actuated by switch blade movement, providing instant circuit interruption without external arc or flame.



Typical oscillogram made during interrupting test of Delta-Star's Powerupter at 15 kv.



NOW

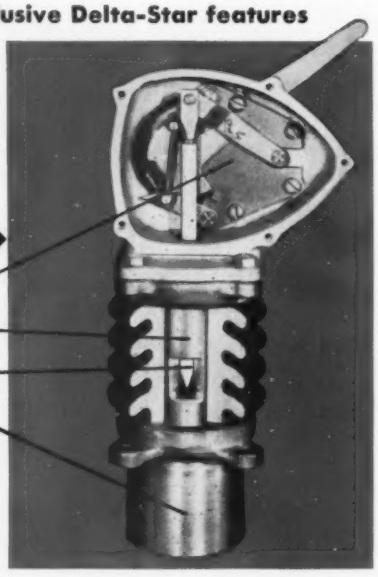
DELTA-STAR'S New *Powerupter* Switch!

Voltage ratings from 7.5 kv through 34.5 kv—built with exclusive Delta-Star features

This new Delta-Star Powerupter combines a new interrupting device with the most modern disconnecting switches—for interrupting load, magnetizing and charging currents.

The Powerupter features heavy duty construction throughout. Its exclusive automatic trip mechanism provides instant breaking and making speeds independent of switch operation. No feature of Delta-Star switches is sacrificed—every characteristic is retained.

Cutaway view shows *Powerupter* operating advantages



Powerful, high speed mechanism controls speed of Powerupter's operation independently of main switch operating time.

Arcing chamber lined with gas-evolving material. Chamber contains stationary contact and moving contact.

Follower of gas-evolving material confines arc—insuring rapid arc extinction at low current values.

Exhaust chamber provided with muffler—confines and cools exhaust gases released from interrupting chamber.

Ratings: Voltages, 7.5 kv through 34.5 kv; interrupting capacity 600 amp. Continuous current ratings, 400, 600, 1200, 2000 amps.

For all the facts, write Delta-Star or ask your nearby representative. Delta-Star Electric Division, H. K. Porter Company, Inc., 2437 Fulton St., Chicago 12, Ill. District offices in principal cities.

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.

Divisions of H. K. Porter Company, Inc.: Connors Steel, Delta-Star Electric, H. K. Porter Company (Canada) Ltd., Henry Disston, Leschen Wire Rope, Quaker Rubber, Refractories, Riverside-Alloy Metal, Vulcan Crucible Steel, W-S Fittings.

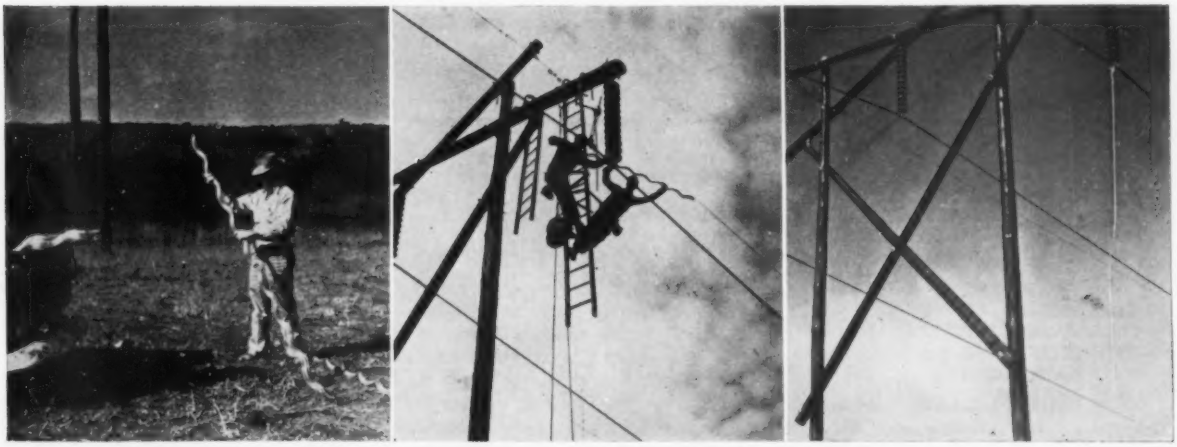
Preformed rod experience data

One of the largest Southern operating companies reports favorably on the use of these relatively new products for line construction and maintenance. They are being used to reinforce conductors at point of support on the company's first 230-kv line.

By R. E. L. Shirley
Distribution Field Supervisor
Georgia Power Company
Atlanta, Ga.

◆ THE PERFORMANCE record of preformed products in this company has been excellent. However, this material represents a relatively new industry. The period of general usage of preformed items is less than ten years, and "father time" has not had sufficient years to work on them. Mr. Einstein's theory states in part that everything has *time* as a fourth dimension. If we could only supply the time element to new items, then there would be no question as to performance.

In this day of rapid advances, inventions and improvements, we cannot afford nor is it always advisable to wait until every idea and device is thoroughly time tested. Proper research and laboratory testing can analyze and predict to a remarkable degree the qualities and durability of products. In the case of preformed products, we must give credit to the manufacturers for making



These views show work in progress on Georgia Power's first 230 kv line. The 1,033 MCM conductors are being reinforced at point of support with preformed rods to protect against wear and flashovers. The company reports excellent performance record for similar armor rods on other types of construction.

available the results of research and laboratory testing of their products. The manufacturers in addition to providing much data, have shown us most conclusive tests and evidence of the excellent performance of most of their products.

Some of these tests were made in the laboratories of dis-interested parties, such as the Georgia Institute of Technology. Our purchase of these devices has also been influenced by our own testing and experience. We have increased our usage of these items as experience, analysis and judgment indicated.

In this paper the items with which we have had experience will be discussed one at a time and the order of listing will be chronological with respect to first usage.

Armor rods for ground wires

Our first purchase of these rods began in 1949 when preformed armor rods were installed to protect overhead ground wires at structure supports. Our 44 kv structure design was being changed from a suspension type overhead ground support to a rigid overhead ground support. The principle reason for this change was economic, i.e., to reduce the cost of the overhead ground wire installation.

In using a rigid support, it was felt that some protection from vibration was necessary, however, prevailing conditions conducive to vibration did not appear sufficient to require Stockbridge dampers. Test data supplied by the manufacturer indicated that preformed rods provided what we believed might be sufficient protection for prevailing conditions. The preformed rods provided armor protection at the support, were easy to install and readily available.

For these reasons, preformed armor rods were specified for our overhead ground wires in this rigid support and have been used in this application exclusively since the first installation in 1949. So far, we have no record of any failures where this protection has been provided. In 1956 an examination of some of the original installations was made, and no evidence of damage was apparent.

We have no comparable installations without the armor rods for comparison. Practically all our overhead ground wire is galvanized steel; consequently, most of the rods used were galvanized steel. Copperweld rods were used on the relatively few Copperweld ground wire installations made during this period.

Our records show that we have installed since 1949 a total of about 10,000 sets which are protecting overhead ground wires at support locations.

Armor rods on conductors

A considerable difference of opinion exists as to the damping qualities of the various types of conductor armor rods on the market. After witnessing many tests on armor rods, carefully studying the results of these tests, and reviewing our experience with both straight and tapered rods as well as the experience of others, we have come to certain conclusions regarding the choice of types of armor rods. Both straight and tapered rods have been used on our system for 25 years or more. No fatigue failure of conductor strands under these rods has occurred during this time. Their performance is considered satisfactory, and they are on our approved list of material.

Our experience record with preformed rods is not very long, only about 8 years on overhead ground wire and 5 years on conductors, but we have just recently made a very careful examination of several of our oldest installations. There was no evidence of fatigue failure or conductor damage of any kind under the rods, indicating that their performance so far has been adequate.

Both laboratory and field data available to us at present lead us to the conclusion that preformed rods provide adequate protection to the conductor and at the same time are more economical and easier to install. Another important feature of preformed rods is their re-usability. It is for these reasons we approve preformed rods for general conductor use.

The Georgia Power Company has installed on its system about 12,500 sets of preformed rods protecting ACSR conductors and about 500 sets which are protecting copper conductors.

Conductor protection

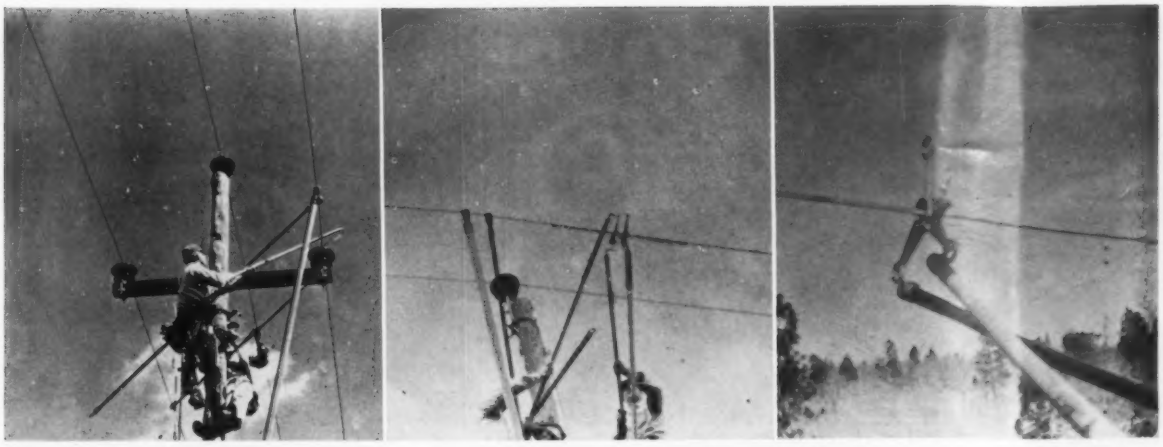
After several rapid rises in the price of copper during the first part of 1955, a decision was made by our company to use ACSR conductors almost exclusively on distribution. It was further decided that bare ACSR conductors should be protected from wear, scuffing, and flash-over at points of support. Since span lengths on urban distribution would usually be less than 350 feet, and since the wires would be strung rather slack, it was decided that there was no need to provide vibration protection.

Thus only an inexpensive light armor protection was indicated. After an investigation of installed costs, safety, and ability to apply to energized lines, it was decided that a short preformed armor rod called a Line Guard was the best all around solution to this problem. Our linemen can install these with considerably less labor than straight twisting rods, and hot line work can be handled more satisfactorily than with straight rods. There is very little difference in cost between the two types of equivalent rods.

The length and number of rods to make up a set varies with the size of the ACSR conductor used. For instance on #2 ACSR, we use 9 rods that are 21 inches long, while 16 rods of 37 inches in length are used for 336 MCM (see accompanying tabulation).

Size of conductor	Number of rods per set	Length of line guard	Rod diameter
4 ACSR	8	19 inches	.121
2 ACSR	9	21 "	.121
1/0 ACSR	11	25 "	.121
2/0 ACSR	13	27 "	.121
4/0 ACSR	15	31 "	.121
266.8 ACSR	14	33 "	.146
336.4 MCM ACSR	16	37 "	.146
397.5 MCM ACSR	17	39 "	.146
477 MCM ACSR	19	41 "	.146
636 MCM ACSR	19	45 "	.180

The above table shows specific information for preformed line guards used as an inexpensive light armor protection on ACSR urban line conductors by the Georgia Power Company.



Repairs are being made here with hot line tools on a 44-kv #2 copper conductor which had been damaged at insulator support by a lighting flashover. The preformed repair splice will increase the damaged lines tensile strength and conductivity, as well as providing armor protection at point of support.

These rods are easily and quickly installed once a lineman gets used to them. They provide excellent conductive armor for such current connections as hot line clamps. One of the best features about these protective rods is that they are re-usable.

Our records show we have installed about 11,000 sets since we first began using them two years ago. To date, we have had no record or report of any type of failure.

Preformed repair splices

This company has found a very definite and desirable use of preformed splices for "patching" damaged strands of both copper and aluminum conductors. Several tests were made, and it was found that tensile strength and conductivity could be restored almost 100% to these damaged conductors by the use of these special rods.

Most of this damage occurs on unarmored conductors at the point of support, although there is some caused by shotguns and rifles. Our records show that about 350 sets have been used to patch copper or Copperweld wires and 94 sets for patching ACSR wires. There has been no reported record of failure either electrically or mechanically of such patched wires.

Conductor grip dead ends

In addition to data furnished by the manufacturer, we conducted some tests of our own on preformed dead ends for ACSR conductors. Our tests showed that new preformed grips when applied as a free loop dead end on ACSR would average about 58% of the full strength of the ACSR conductor. The poorest test showed the grip held 48% of the ultimate strength of ACSR.

Our distribution specifications, under extreme loading conditions, require only 40% of the ultimate strength of the ACSR. Therefore, it appeared that if we could depend on the dead ends to hold 50%, then there was little occasion to doubt that we had sufficient holding strength.

These devices make a very neat and inexpensive dead end for the ACSR. When doing hot line work, it is easier to "cover up" these streamlined dead ends than regular clamp type devices.

We have installed on our distribution system some 3,000 sets of these ACSR conductor dead ends. There has been no report or indication of failure of any of these devices. A goodly number of these grips have been installed for about two years, and since no trouble has shown up, we are considering a greater use of them.

Galvanized strand guy grips

In 1953 we were given a few samples of guy grips which we used for test purposes. We conducted tests in our shops as well as observed tests at the Georgia Institute of Technology. These tests showed that the strength and holding power of the grips exceeded that of two guy clamps. They showed that without exception, the grips would break the guy strand with practically no measurable slippage.

The tests showed a 50% time saving as compared to the installation of two bolted clamps. The material costs were about the same. The preformed grips make a much neater and a more streamlined installation. Field experience shows that this device will not slip or turn loose under an impact load.

Another advantage of this grip is that it requires no special tools, and the load can be picked up and released much quicker than with bolted clamps.

The preformed grips have loops already formed for the guy rod and guy hook, which results in a saving of the labor formerly required to make them by hand, on the job, and frequently under adverse working conditions. Where guy grips are used at the top of the guy, it is easy to extend strands of the guy wire for attachment to multigrounded systems.

About the only difficulty encountered with installation is the over-pull of the guy strand that is necessary to compensate for a few inches which is lost when attaching the grip to the end of the pulled strand.

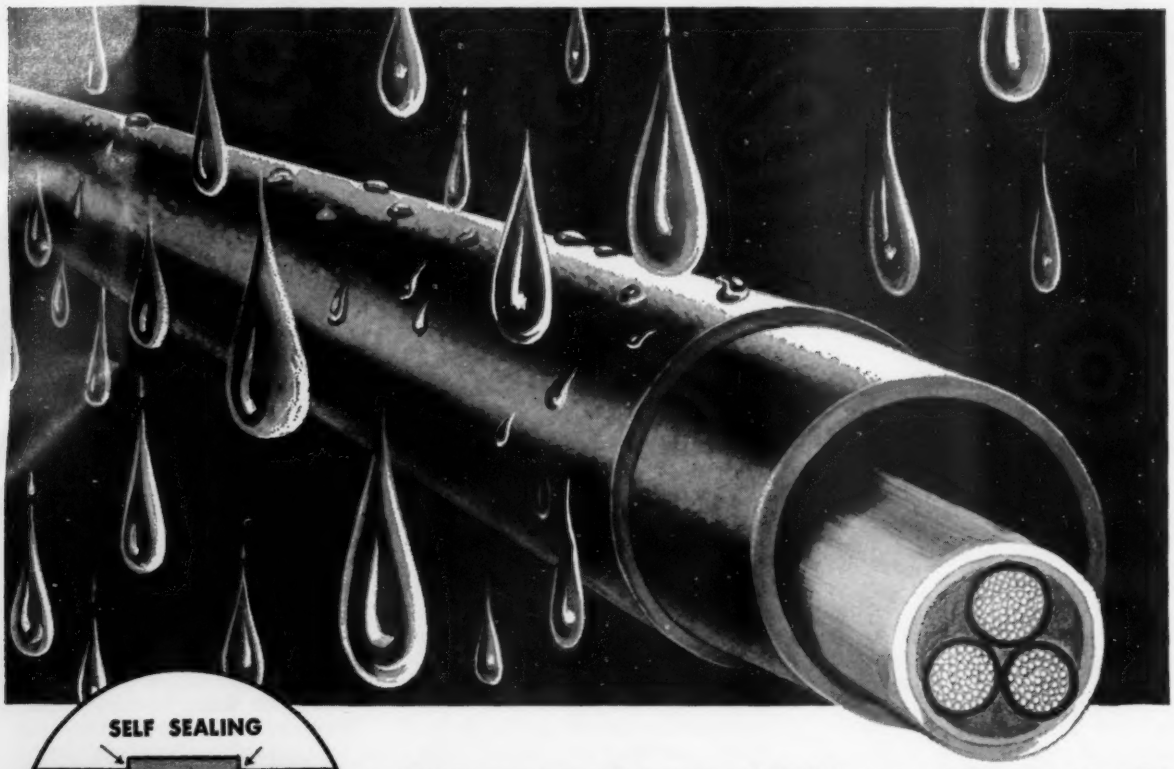
Our company has used about 28,000 of these guy grip dead ends, and there has been no failure or trouble of any kind reported.

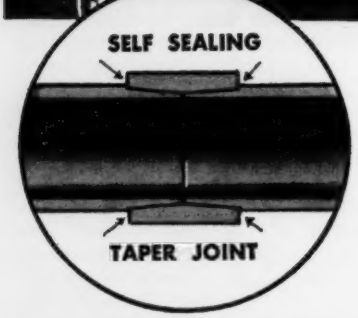
Armor grip suspension units

The transmission section has ordered some of these devices for a particular line, but they have

(Continued on page 106)

WATERTIGHT!





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A-5145

Economic and safety factors of cluster mounted transformers

Three years of experience by a large Southern company justifies direct pole mounting of transformers in clusters and as singles.

By W. O. Whitt
Senior Distribution Engineer
Alabama Power Co.
Birmingham, Ala.

◆ MUCH has been written about the crossarm mounted transformers as opposed to cluster mounted transformers and single direct-pole-mounted transformers at the secondary level. In the interest of economy, safety and appearance, many of the operating companies, in recent years, have been experimenting with the new installations.

With the rising cost of materials and labor, early in 1954, the first cluster mounted transformer specifications were adopted on the Alabama Power Company system. The reason for this specification change was not for economy reasons alone, for we were well aware that over fifty per cent of the accidents occuring on overhead lines due to electrical contact were on transformer installations.

Primarily for these two reasons —economy and safety—the new specifications were adopted, and our experience so far has been good.

It will be the purpose of this paper to discuss the economy and safety factors involved in cluster mounted transformers and single transformers installed at the secondary level as they apply to the Alabama Power Company specifications. In order to present a true comparison, the installations will be considered according to transformer voltage classes as follows:

Single-phase installations

This article will deal with 4 kv common neutral systems, including both 2.4 kv single-phase and 4 kv three-phase systems. A following article will discuss 12 kv and 13.2 kv common neutral systems, both single-phase and three-phase.

Figure 1. This diagram shows the 2.4 kv transformers with crossarm mounting which we were using prior to 1954. You will note that the primary jumper is located on crossarm extension pins on the ends of the arms, and the secondary is located above the transformer with a minimum separation of twelve inches between the secondary and transformer hanger arm. This specification was used in mounting transformers up to 50 kva; however, it was necessary to stack the hanger arms on the 37½ kva and 50 kva installations.

Figure 2. This drawing shows the specifications for the single phase direct pole mounted installation that was adopted in 1954. If a primary crossarm is in place, the cutout and arrester are mounted on the crossarm. If this is not the case, a combination cutout and arrester bracket is mounted 2 feet from the top of the pole. The primary jumper from the cutout to the high side transformer bushing is RINS, 5 kv cable. The transformer is installed 5.5 feet from the top of the pole and at 30° to the line. Some companies have used the offset brackets for the secondary and have mounted the transformer in line; however, we have found the 30° mounting to be entirely satisfactory. The secondary is located at the transformer level nine inches below the top transformer hanger bracket.

Table 1. This shows in tabulation form a cost comparison between the crossarm mounted and direct pole mounted transformers. The cost estimates include the installed cost of material not common to both installations, while pole, transformer, cutouts and arresters have been omitted. From this tabulation, it may be seen that the direct pole mounted installation provides a saving of approximately $25.00 per installation. In addition, the direct pole mounted installation requires approximately three feet less pole space than does the crossarm mounted transformer. This is often a very important saving especially where joint use is involved, although it is difficult to estimate.

Table 2. This shows the approximate pole space required for mounting various sizes of transformers as shown on the two specifications. Average transformer heights were used for this tabulation.

Direct pole mounting

The direct pole mounted installation will also provide reduced maintenance and operation costs, since the number of wood crossarms is reduced and the secondary is more accessible.

The direct pole mounted transformer has many advantages over the crossarm mounted transformer from a safety standpoint. The main advantage is that the hazards due to the primary jumpers have been greatly reduced by the pole mounted installation. This has been accomplished through the elimination of the primary jumpers on the ends of arms, by using the RINS, 5 kv cable from the cutout to the transformer and by moving the secondary to the transformer level.

These changes make the secondary readily available for stringing additional services and reduce labor costs for this work since one service installer may now install many services that required a small service crew with the crossarm mounted transformers. With the new specifications, the transformer and primary conductors in the lower working space can be de-energized by opening the primary cutout.

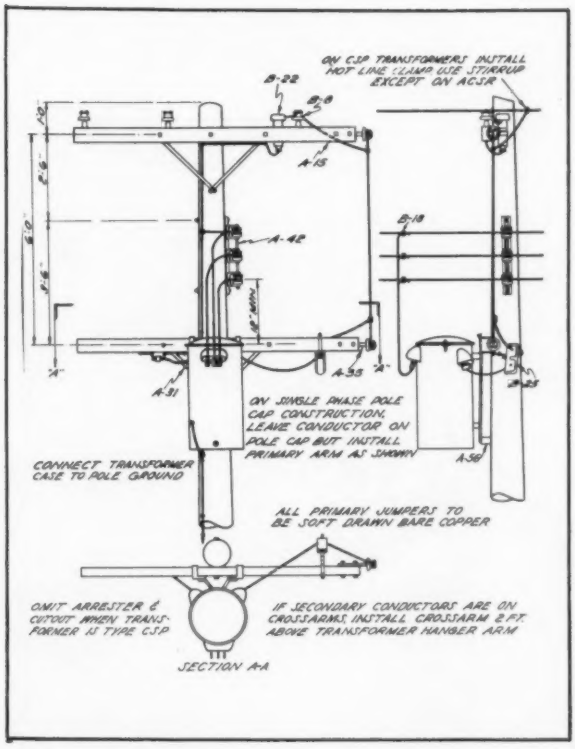
ON C.S.P. TRANSFORMERS INSTALL HOT LINE CLAMP USE STIRRUP EXCEPT ON ACSR
B-22
B-8
A-15
A-42
B-18
A-31
A-35
A-36
ON SINGLE PHASE POLE CAP CONSTRUCTION, LEAVE CONDUCTOR ON POLE CAP BUT INSTALL PRIMARY ARM AS SHOWN
CONNECT TRANSFORMER CASE TO POLE GROUND
ALL PRIMARY JUMPERS TO BE SOFT DRAWN BARE COPPER
OMIT ARRESTER & CUTOUT WHEN TRANSFORMER IS TYPE C.S.P.
IF SECONDARY CONDUCTORS ARE ON CROSSARMS, INSTALL CROSSARM 2 FT. ABOVE TRANSFORMER HANGER ARM
SECTION A-A

Fig. 1. Specifications of crossarm mounted transformer installations used prior to 1954.

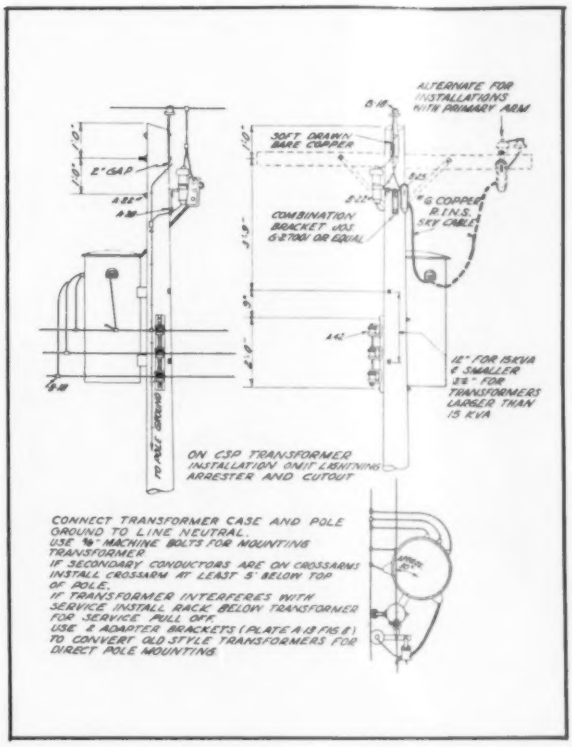
ALTERNATE FOR INSTALLATIONS WITH PRIMARY ARM
B-18
SOFT DRAWN BARE COPPER
2" GAP
COMBINATION BRACKET U.S. G-2700 OR EQUAL
#6 COPPER R.I.N.S. SKY CABLE
A-42
12" FOR 15 KVA & SMALLER 18" FOR TRANSFORMERS LARGER THAN 15 KVA
ON C.S.P. TRANSFORMER INSTALLATION OMIT LIGHTNING ARRESTER AND CUTOUT
CONNECT TRANSFORMER CASE AND POLE GROUND TO LINE NEUTRAL.
USE ⅝" MACHINE BOLTS FOR MOUNTING TRANSFORMER
IF SECONDARY CONDUCTORS ARE ON CROSSARMS INSTALL CROSSARM AT LEAST 5' BELOW TOP OF POLE.
IF TRANSFORMER INTERFERES WITH SERVICE INSTALL RACK BELOW TRANSFORMER FOR SERVICE. PULL OFF.
USE A ADAPTER BRACKETS (PLATE A 13 FIG E) TO CONVERT OLD STYLE TRANSFORMERS FOR DIRECT POLE MOUNTING.

Fig. 2. Specifications for single-phase direct-pole-mounted transformer adopted in 1954.

TABLE 1

COST COMPARISON 2.4 KV SINGLE PHASE TRANSFORMERS ON 4.16 KV COMMON NEUTRAL SYSTEM

Transformer Size	5 KVA	10 KVA	15 KVA	25 KVA	37.5 KVA	50 KVA	75 KVA	100 KVA
Direct Pole Mounted	$ 8.00	$ 8.00	$ 8.00	$ 8.00	$ 8.00	$ 8.00	$15.00	$15.00
Cross Arm Mounted	33.00	33.00	33.00	33.00	46.00	46.00	—	—

Above cost figures represent the installed cost of materials not common to both installations. The cost of pole, transformer cutout and arresters common to both specifications have been omitted.

TABLE 2

POLE SPACE REQUIRED FOR INSTALLATION

Transformer Size	5 KVA	10 KVA	15 KVA	25 KVA	37.5 KVA	50 KVA	75 KVA	100 KVA
Direct Pole Mounted	6.25'	6.25'	6.25'	7.0'	7.0'	7.5'	7.75'	7.75'
Cross Arm Mounted	9.25'	9.25'	9.5'	10.0'	10.5'	10.75'	—	—

Pole spaces required are based on average transformer heights.

TABLE 3

COST COMPARISONS 3 PHASE INSTALLATION ON 4.16 KV SYSTEMS USING 2.4 KV TRANSFORMERS

Transformer Size	3-5	3-10	3-15	3-25	3-37½	3-50	3-75	3-100
Direct Pole Mounted	$ 54.00	$ 54.00	$ 56.00					
Cluster Mounted				$130.00	$130.00	$130.00	$155.00	$155.00
Cross Arm Mounted	124.00	135.00	154.00	154.00	154.00			
Platform Mounted						495.00	536.00	536.00

Above cost figures represent the installed cost of materials not common to both installations. The cost of poles, transformers, cutouts, and arresters common to both specifications have been omitted.

TABLE 4

POLE SPACE REQUIRED FOR INSTALLATION

Transformer Bank Size	3-5	3-10	3-15	3-25	3-37½	3-50	3-75	3-100
Direct Pole Mounted	11'	11'	11'					
Cluster Mounted				10.25'	10.25'	10.75'	11'	11'
Cross Arm Mounted	9.25'	9.25'	9.25'	10.0	10.5			
Platform Mounted						15.0'	15.0'	15.0'

Pole spaces required are based on average transformer heights. Space required on platform mounted transformers based on structures installed in main primary lines.

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This is not the case with the crossarm mounted transformer since the cutout is located on the hanger arm and does not de-energize the primary jumper on the ends of the arms when opened. We feel that this feature, coupled with the use of 5 kv insulated cable for the primary jumper from the cutout to the transformer, will greatly reduce the number of electrical contact accidents occurring on transformer installations.

It may be said then, that on 4 kv common neutral systems, the pole mounted single phase transformers installed at the secondary level do have very definite economical and safety advantages over the crossarm mounted installations.

Three-phase installations

We will now consider three-phase installations on 4 kv systems using 2.4 kv transformers.

Figure 3. This drawing shows the specifications that we were using prior to 1954 for installations up to and including 37½ kva transformers. You will note that, like the single phase installations, the transformers are mounted on crossarms, the cutouts are mounted at the hanger arm level, and the primary jumpers are located on crossarm extension pins. The secondary is again located above the transformers with a minimum separation of twelve inches between the secondary conductors and primary neutral bus.

Figure 4. This drawing shows method of installing 3 - 50 kva transformers and larger prior to 1954. Our two-pole structure has been redesigned to accommodate three-phase banks up to 1000 kva and is still being used to serve some of the larger power customers where it is apparent that larger transformers will be required for future load. In most cases, however, either the cluster mounted or direct pole mounted transformer specification is used.

Figure 5. This diagram shows the new specifications for mounting 3 - 37.5 kva transformers and smaller, using direct pole mounted transformers. The cutouts and arresters are installed on the primary arm, and the primary jumpers are RINS, 5 kv cable installed in two-inch fiber conduit located under the primary arm and down the pole to the transformers. The secondary is located on the level with the top transformer. You will also note that two of the transformers are mounted at 30° to the line while the third transformer is installed 90° to the line. With this transformer mounting arrangement, a single-phase installation may be changed to three-phase without reframing the existing installation. In addition, climbing space is provided on the side of the pole on which the primary cutouts are located. The primary cutouts can easily be operated by a man using a 10 ft. operating stick, working from a position below the bottom transformer.

Mounting three 100's

Figure 6. This shows the cluster mounted transformer bank specification that is now used for mounting transformer banks from 3 - 25 kva through 3 - 100 kva transformers. You will probably note that both the cluster mounted and direct pole mounted specifications will accommodate a bank of 3 - 25 kva and 3 - 37½ kva transformers; however, on all new installations the cluster mounted specification is used. As in the case of the direct pole mounted banks, the cluster mounted banks have the cutouts and arresters installed on the primary arm and RINS 5 kv cable installed in two-inch fiber conduit. The secondary is located above the transformers.

Cost comparisons

Table 3. This shows in tabulation form the cost of the crossarm and platform mounted three-phase installations as compared with the direct pole mounted and cluster mounted three-phase transformer banks. The cost estimates reflect the installed cost of materials not common to both installations, while cost of poles, transformers, cutouts and arresters have been omitted. The new specifications show a very definite saving over the old specifications.

For instance, the direct pole mounted installations using 37.5 kv transformers and below, show an average saving of approximately 60% on the installed cost of material not common to both installations when compared to the crossarm mounted transformers. If the 25 kva and 37½ kva transformers are mounted using the cluster brackets, an average saving of only 16% is realized; however, on installations of 50, 75 and 100 kva, a saving of approximately 72% is shown. That is, on installations using 15 kva transformers and below, the new specifications show a saving of approximately $81 per installation; on 25 kva and 37½ kva transformers, a saving of $24 or $124 is realized, depending on whether the direct pole mounted or cluster mounted specifications are used; and on installations of 50 kva, 75 kva and 100 kva transformers, an average saving of $336 per installation is shown.

Table 4. This shows the pole space required for mounting the various size transformer banks. Approximately the same pole space is required for mounting 37½ kva transformers and below; however, the new specification requires four feet less pole space for mounting 50, 75 and 100 kva transformers.

Safety features gained

From a safety standpoint, the new specification eliminates the exposed primary jumpers on the ends of the crossarms. In addition, when the primary cutouts are opened, all the installation below the primary arm is de-energized. On the old installation, opening the primary cutout did not de-energize the primary jumpers on the ends of the arms. This feature presented a hazard due to proximity of the primary jumpers that is eliminated with the new specification. We believe that raising the cutouts to the primary arm and the use of the 5 kv cable in the two-inch fiber conduits will decrease accidents on three-phase installations on this voltage class.

In addition to the economics realized on installation cost and the safety advantages presented by the cluster mounted transformers, these installations give a more evenly distributed pole loading, making possible the mounting of larger banks. Maintenance costs are reduced through the elimination of the crossarms, and operating costs are reduced since hot line work required for making additions on these installations is reduced.

Our experience with the cluster mounted transformers has been good and operating personnel in the field are very pleased with the installation.

(This article was adapted from a paper presented at a recent meeting of the Engineering and Operation Section of the Southeastern Electric Exchange. A second article discussing cluster mounted transformers on 12 kv and 13.2 kv common neutral systems will appear next month.)

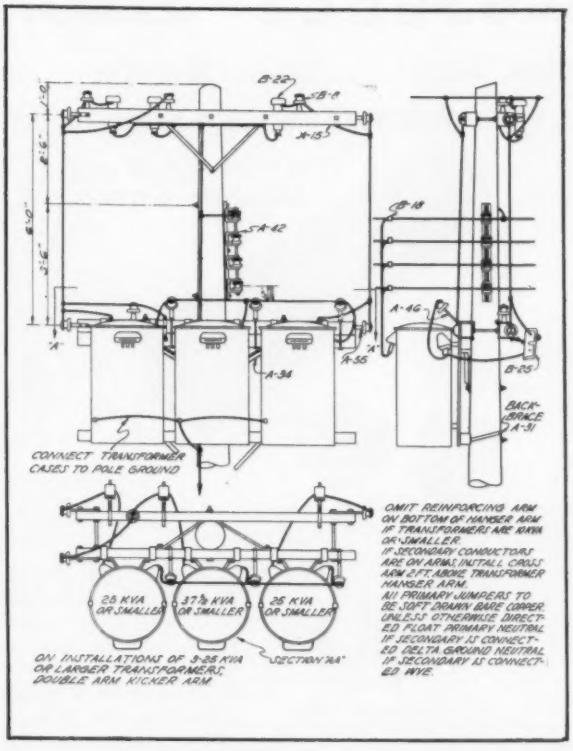
B-22
SB-1
X-15
A-42
SP-19
A-46
A-55
A-34
B-25
BACK BRACE A-31
CONNECT TRANSFORMER CASES TO POLE GROUND
OMIT REINFORCING ARM ON BOTTOM OF HANGER ARM IF TRANSFORMERS ARE 10 KVA OR SMALLER.
IF SECONDARY CONDUCTORS ARE ON ARMS INSTALL CROSS ARM 2 FT. ABOVE TRANSFORMER HANGER ARM.
ALL PRIMARY JUMPERS TO BE SOFT DRAWN BARE COPPER UNLESS OTHERWISE DIRECTED. FLOAT PRIMARY NEUTRAL IF SECONDARY IS CONNECTED DELTA. GROUND NEUTRAL IF SECONDARY IS CONNECTED WYE.
25 KVA OR SMALLER
37½ KVA OR SMALLER
25 KVA OR SMALLER
SECTION "AA"
ON INSTALLATIONS OF 3-25 KVA OR LARGER TRANSFORMERS, DOUBLE ARM KICKER ARM.

Fig. 3. Specifications for three-phase installations with up to 37½ kva units used prior to 1954.

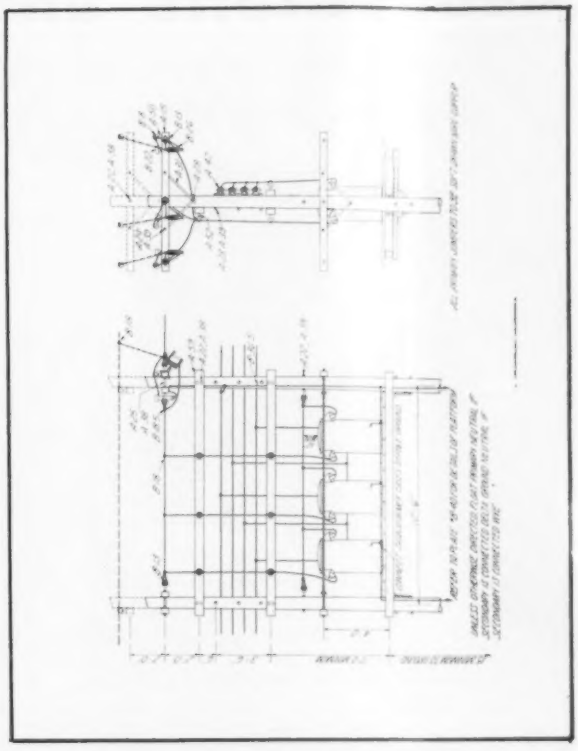

Fig. 4. Specifications for banks containing three 50-kva units and larger as used previous to 1954.

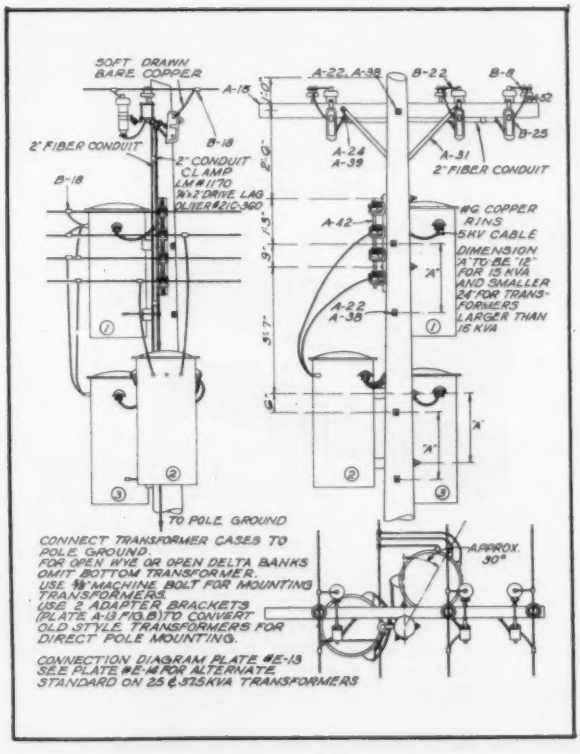
SOFT DRAWN BARE COPPER
A-18
B-18
2" FIBER CONDUIT
2" CONDUIT CLAMP LM # 1170 ½"x2" DRIVE LAG OLIVER #21-C-360
A-22, A-38
B-22
B-8
B-25
A-24
A-39
A-31
2" FIBER CONDUIT
A-42
#6 COPPER RINS 5KV CABLE
DIMENSION "A" TO BE 12" FOR 15 KVA AND SMALLER 24" FOR TRANSFORMERS LARGER THAN 15 KVA
A-22
A-38
TO POLE GROUND
CONNECT TRANSFORMER CASES TO POLE GROUND FOR OPEN WYE OR OPEN DELTA BANKS OMIT BOTTOM TRANSFORMER. USE ½" MACHINE BOLT FOR MOUNTING TRANSFORMERS. USE 2 ADAPTER BRACKETS (PLATE A-13 FIG. B) TO CONVERT OLD STYLE TRANSFORMERS FOR DIRECT POLE MOUNTING.
APPROX. 30°
CONNECTION DIAGRAM PLATE #E-13 SEE PLATE #E-14 FOR ALTERNATE STANDARD ON 25 & 37.5 KVA TRANSFORMERS

Fig. 5. Present specifications in use for three-phase banks of 37½ kva units and smaller.

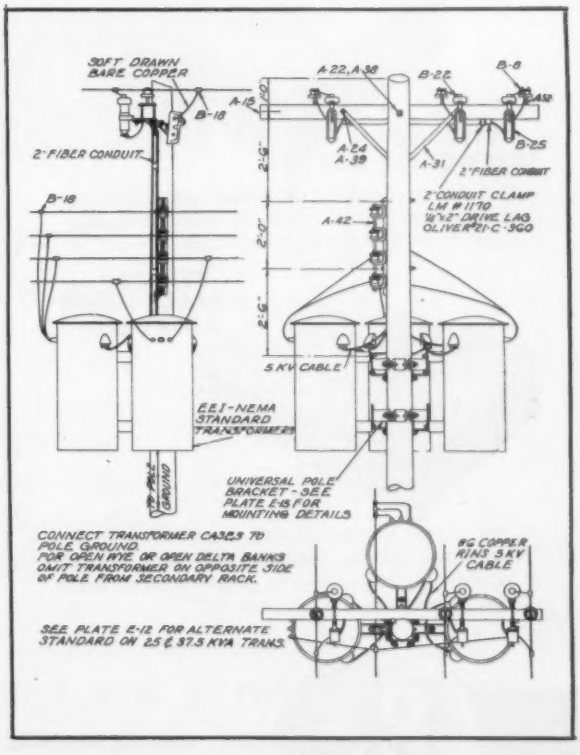
SOFT DRAWN BARE COPPER
A-18
B-18
2" FIBER CONDUIT
A-22, A-38
B-22
B-8
B-25
A-24
A-39
A-31
2" FIBER CONDUIT
2" CONDUIT CLAMP LM # 1170 ½"x2" DRIVE LAG OLIVER #21-C-360
A-42
5 KV CABLE
EEI-NEMA STANDARD TRANSFORMERS
TO POLE GROUND
UNIVERSAL POLE BRACKET - SEE PLATE E-15 FOR MOUNTING DETAILS
CONNECT TRANSFORMER CASES TO POLE GROUND FOR OPEN WYE OR OPEN DELTA BANKS OMIT TRANSFORMER ON OPPOSITE SIDE OF POLE FROM SECONDARY RACK.
#6 COPPER RINS 5 KV CABLE
SEE PLATE E-12 FOR ALTERNATE STANDARD ON 25 & 37.5 KVA TRANS.

Fig. 6. Present specifications for cluster mounted three-phase banks of up to three 100 kva units.

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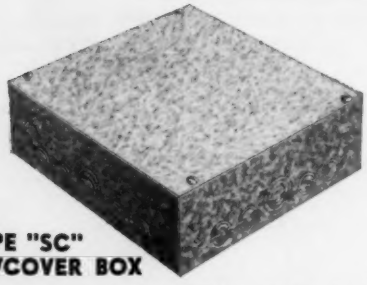
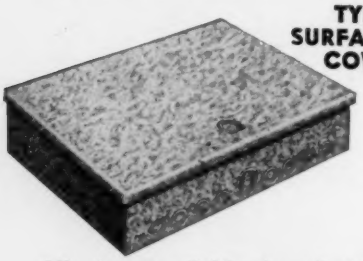


TYPE "SC" SCREWCOVER BOX

Durable Formed Construction, galvanized or grey enamel finish, with or without knockouts. Sizes to your specifications.

TYPE "A" SURFACE HINGE COVER BOX



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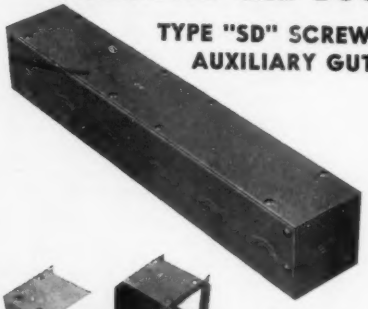
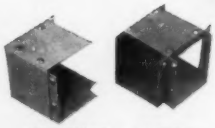
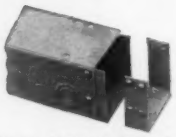
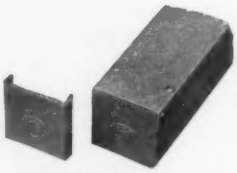




ELBOW and TEE



"U" CONNECTOR



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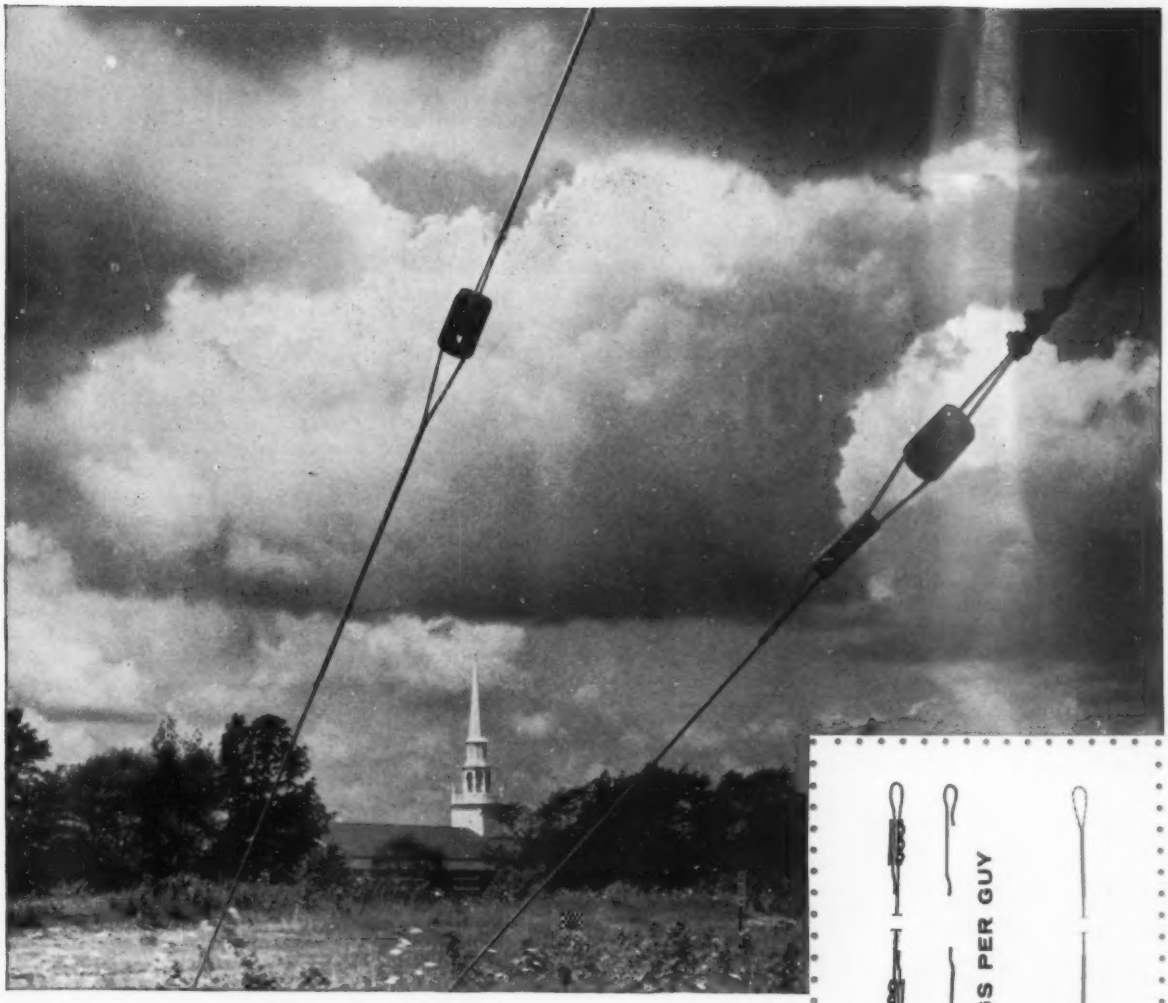

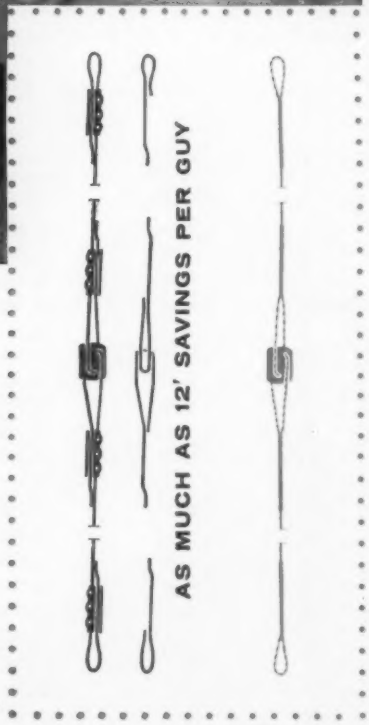

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Computing distribution transformer

The transformer loading program of Dallas Power and Light Company is based on the premise that there is a quantitative relationship between a customer's kwh consumption during the peak load billing period and his demand kva. Computer is used to calculate kva demands from kwh meter readings for each transformer.

By Perry G. Brittain

Engineer
Dallas Power and Light Co.
Dallas, Texas

◆ RAPIDLY INCREASING load densities in residential areas on the Dallas Power & Light Company system have made necessary an annual examination of individual transformer loading. Electronic computer equipment, normally used for billing calculations, is used to compute kva demands from kwh meter readings obtained during the peak load season, for each transformer.

This scheme is a natural development from previous transformer loading practices. Back when the distribution primary voltage was 4 kv and conventional transformers were used, loads were examined by using thermotels to measure oil temperature. As the system was gradually converted to 13 kv primary voltage, overload signal lights on CSP type transformers were the sole check on loading. The distribution system became predominantly 13 kv, with banked CSP transformers. The tripping of one secondary breaker from overload usually resulted in loss of the bus through tripping of other transformer breakers.

By about 1947, the use of residential air conditioning had greatly accelerated summer load growth. Overload outages had increased, and most of the transformer capacity was being installed under pressure during peak load periods and with overtime labor rates. It was realized that a method was needed for anticipating future transformer requirements rather than waiting for overload signals to appear.

Test Location No.	(a) Meas. Transf. Max. Kva	(b) Total Kwh Supplied By Transf.	(c) Meas. K Factor (a)/(b)	(d) *Calculated Transf. Kva
1	42.0	13,786	.0030	41.4
2	18.0	5,068	.0036	18.5
3	15.7	4,234	.0037	15.4
4	43.2	13,220	.0033	45.6
5	21.0	4,740	.0045	17.5
6	19.2	4,456	.0043	17.2
7	14.4	3,362	.0043	13.1
8	33.6	10,408	.0032	35.8
9	7.5	1,298	.0058	5.1
10	49.0	14,988	.0036	49.7
11	30.0	7,450	.0040	27.6
12	16.3	3,936	.0041	15.1
13	29.2	8,492	.0034	30.4
14	45.3	13,640	.0033	47.9
15	44.8	11,952	.0037	40.4
16	24.0	8,244	.0029	27.4
17	18.4	5,206	.0035	19.9
18	60.0	15,810	.0038	55.8
19	60.0	18,574	.0032	59.3
20	85.9	23,938	.0036	78.0

* Sum of kva demands calculated for each customer using individual kwh reading and the following K Factors:
.0039 - 0 to 500 kwh; .0035 - 500 to 1500 kwh; .0030 all over 1500 kwh

Fig. 1. Typical test data obtained during the 1956 peak load period, for use in the selection of K factors.

Transformer replacement

A transformer replacement program was launched. During the fall and winter off-peak seasons, each secondary bus on the distribution system was examined and loading on each transformer was "calculated," using an actual service count and average kva per customer values. This average kva per service for typical areas was determined by tests. The service count information was obtained from map records prepared by a field survey, and maintained by posting daily changes. Transformer capacity was added where the calculated existing load plus the expected one-year load growth exceeded transformer ratings.

This program greatly reduced outages, but was not accurate enough. Too many customers no longer conformed to an average. A scheme was needed which could recognize individual customer loads.

Kwh-kva relationship

The present program of transformer loading is based on the premise that there is a quantitative relationship between a customer's kwh consumption during the peak load billing period and his demand kva. We call this relationship "K factor." It is obvious that this ratio is not exactly the same for each customer. The success of the program does not de-

loading

pend on exactness; it is hinged upon the fact that a single K factor, for a given class of customer, permits calculation of kva loading, from kwh usage, with a predictable degree of accuracy.

To establish the K factor, sample transformers throughout the system were selected and peak kva load and kwh delivered were determined. There are about 25 metering installations installed on typical secondary busses. The installations are moved about to obtain typical data for various types of load. Recording ammeters are used to determine peak kva and the regular kwh-meter readings on the customers supplied by the transformer are totaled for kwh. The ratio of these two values is called the "measured K factor." Basically, the measured K factors are averaged to determine the value for use on the load survey. The measured K factors differ somewhat for different size customers. A customer who runs his air conditioner 24 hours a day builds up a larger kwh total than a neighbor who turns his unit off for a few hours a day. Both might have similar connected loads and the same kva demand. This may appear to destroy the value of the factor, but actually it means that

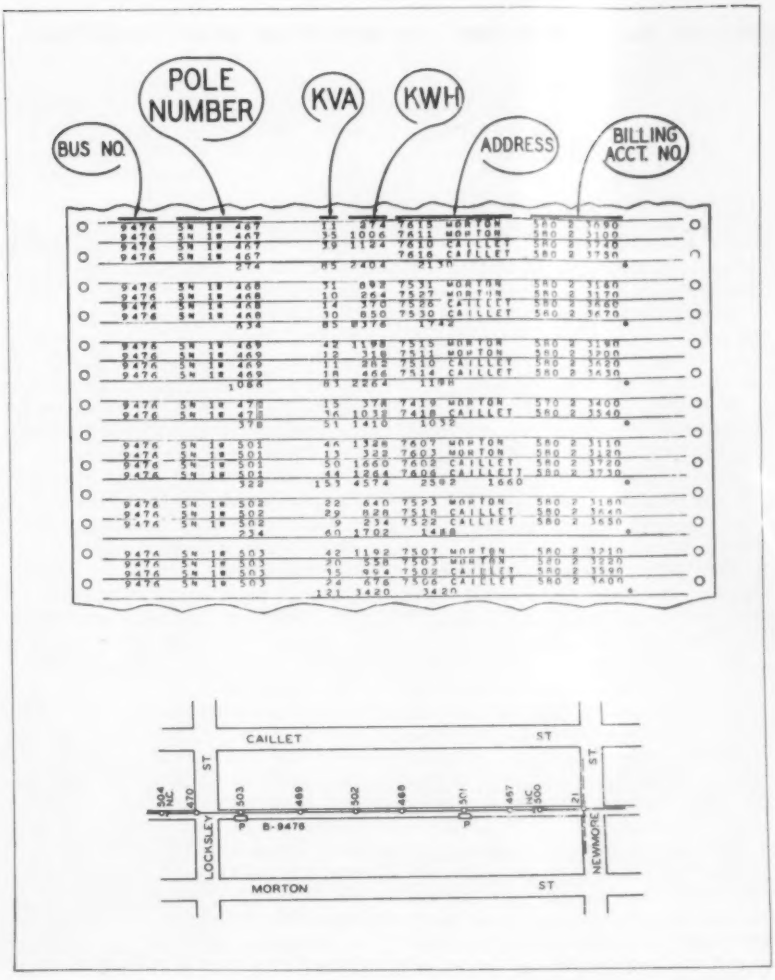


Fig. 2 Selection of tape and diagram of typical secondary bus. This section is complete for one typical secondary bus. Tapes are obtained for the entire distribution system.

RESIDENTIAL BUS OUTAGES CAUSED BY OVERLOAD

YEAR	BUS OUTAGES PER 10,000 CUSTOMERS	MAXIMUM TEMPERATURE °F	TOTAL DAYS OVER 100°
1956	8	109	45
1955	6	104	13
1954	28	111	50
1953	15	108	35

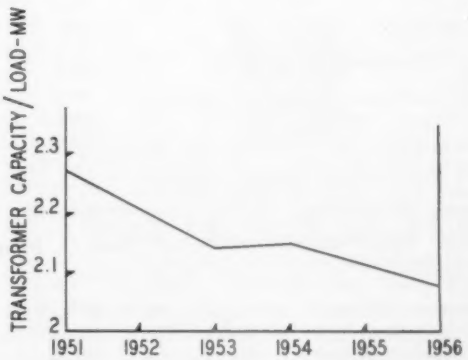


Fig. 3. (left) Outages for the past four years, with weather data necessary for interpretation of the outage record. Fig. 4. (right) Ratio of connected transformer capacity to system demand.

the accuracy of the method can be improved by using different K factors for high, medium, and low kwh-use customers.

Test data

Typical test data which were obtained during the 1956 peak load period are shown in Figure 1. Column (a) in the table is the measured peak kva supplied by the test transformer, and is obtained with a recording ammeter. The product of peak amperes and the nominal bus voltage is the measured kva demand of the transformer.

The total kwh supplied by the transformer during a standard billing period is obtained by totaling the individual meter readings of the customers served from that transformer. These totals are listed in column (b).

The ratio of the measured transformer demand to the total kwh is the measured K factor which is column (c). The variation of the measured K factors with respect to the average kwh consumption per customer, or the size of the customer, was examined, and high, medium, and low-usage groups were arbitrarily established. Within each group a median K factor was selected.

The group division and corresponding factors actually used for the 1957 load survey are shown in the footnote of Figure 1. They are used to compute the kva demand of each customer at these test locations and the sum of these computed demands, column (d), may be compared with the measured transformer loads.

Such a comparison at all test locations revealed that over 80% of the calculated values were within 10% of measured values and over 95% were within 15% of the actual kva.

Computing demand

To compute maximum demand for each customer, using his meter-book kwh readings and an appropriate K factor, is a voluminous task. It is a task readily adaptable, however, to the electronic computer and other accounting machines which are normally used for customer billing. These machines are of the punched-card type. A special file maintained in the engineering department contains a card for each customer which lists the customer's account number, his service pole number, and a secondary bus number. This file was set up by a field survey where each address was aligned with the number of the pole from which it was served. Service orders for new customer connections or service changes being routed to the clerk maintaining this file provides for daily corrections.

These cards are used in conjunction with the regular billing system files to examine transformer loading during any previous meter reading period for any or all meter reading books. Through a routine machine operation, a "tape" or printed list is obtained which records the customer's address, service pole number, kwh consumption and calculated kva demand.

In other words, the computer lists the fixed data just mentioned, looks at the kwh reading, classifies it into a high, medium, or low-use group, selects the appropriate K factor, and computes the kva demand for each customer. It groups these accounts by pole number and accumulates a kva total per pole.

For the annual fall transformer load survey, the billing period with the peak kwh readings for the previous summer is selected. Test data taken during this same period is used to determine K factors. Tapes are obtained for the entire distribution system. A portion of such a tape is shown in Figure 2. This particular section is complete for one typical secondary bus. Each group on the tape is a list of customers on one pole, and the kva for that group is totaled. Just below the tape is a diagram of the same bus.

With information such as this available, the search for transformer capacity is required, the secondary bus is studied in detail, with consideration given to location of transformers, wire sizes, and distance from transformer to load. Work orders for the necessary construction are then prepared. The annual goal is to have these final plans completed during the winter to allow time for construction work to be finished before the summer rush.

Program effectiveness

One of the best measures of the effectiveness of this program is the outage record. A great deal of importance is placed on overload outages. They are harder to explain to a customer than an outage caused by lightning. A customer is sympathetic during a storm, but impatient when his air conditioner goes off during normal weather.

Figure 3 lists outages for the past four years, along with weather data which is necessary for the proper interpretation of the outage record. In 1953 transformer replacement was still based on the bus count and average kva per customer. It was a hot summer, with 35 days of 100 degrees or higher temperatures. The outage record that year was about 15 bus outages per ten thousand customers.

The computer system of transformer loading was started in 1954. Due to the time required to change over to this scheme and the early arrival of summer, only about one-third of the transformer capacity added that year was engineered on calculated loads, and in place before hot weather hit. It was the hottest summer on record, with 50 over-a-hundred days and a maximum temperature of 111 degrees. Outages were high; about 28 per ten thousand customers.

In 1955, the first full year of the survey, outages dropped to 6 per ten thousand, but 1955 was a relatively cool year. It was felt that neither 1954 nor 1955 reflected the true effectiveness of the program.

The real test came in 1956 when temperatures soared above 100 degrees on 45 days. It was the second hottest summer on record, and overload outages remained low; only 8 per ten thousand customers. It might be pointed out that the transformer load calculations used in preparing for the summer of 1956 were based on a light load year. It is felt that accurracy might have been even better had 1955 been a "normal" summer.

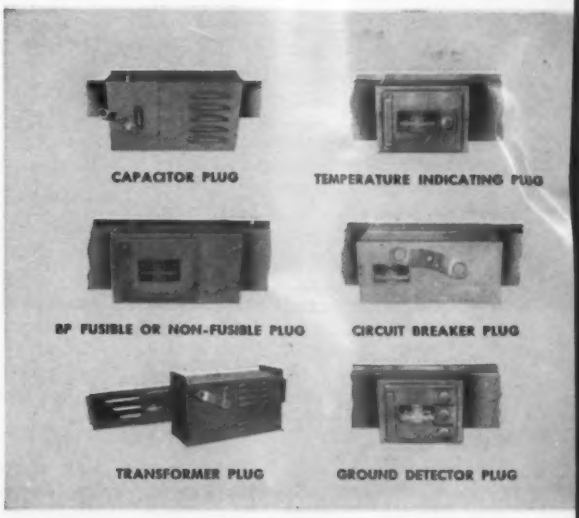
Other values of program

There are additional indications of the value of this transformer replacement program. More of the replacements are simple, in-place increases in sizes, which means that the transformers are being placed on the poles where the largest loads are served. A very tangible gain is the marked reduction in overtime hours, since more transformer capacity is being added routinely during off-peak periods.

All of these advantages point to the value of the practice, but an obvious question appears: Is too

(Continued on page 106)

The Vacu-Break® Plug (above) taps live power, is available in 30 to 600 amps, 2 or 3 pole, 600 volts or less. Reinforced fingers on all plugs insure positive pressure contact.



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Seven rugged Bus Plugs provide flexible plug-in power

Get the most from power with BullDog Bus Plugs. Used with Plug-in Duct, the seven bus plugs range from safety-check plugs to types that tap power instantly from the duct . . . provide safe, flexible electrical distribution.

Plug-in openings are spaced every 10 inches along the duct. Handy to any machine, they reduce long costly branch-circuit runs. You simply plug in circuits where they are needed . . . connect equipment without cutting off power or interrupting production.

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Relay conference highlights

Utility and industrial relay engineers attracted to annual protective relaying conference at Georgia Institute of Technology, sponsored by the American Institute of Electrical Engineers.

◆ PROTECTIVE RELAYING — from generator to industrial plants — was covered by fourteen specialists, representing utility companies, engineering firms, and electrical equipment manufacturers, at the annual protective relaying conference in Atlanta, held recently at Georgia Institute of Technology.

Two special features of this year's conference were the symposium on distribution relaying and the entire afternoon session devoted to industrial plant relaying. Papers presented at other sessions covered a wide range of relay protection problems. Following are some of the highlights of the presentations.

J. S. DeShazo, Georgia Power Co., Atlanta, "Reliable Relays and Settings, with Close Supervision, Give Correct Operation":

"Several points in our application of relays are included here, not as indicative of the best practice but as contributing to good performance on this particular system. . . .

"Extremely inverse relays are used on short low voltage feeders or trunk lines where smaller branch line reclosers or fuses are to be selective. . . .

"For line protection in the absence of distance relays, and on lower voltage circuits, we use General Electric IAC53B and the JBCG53 or a similar Westinghouse C.O. inverse time relay, always with instantaneous trip attachment.

"Transformer taps and relay taps are chosen to take advantage of the steeper slope of the curve for faults somewhat beyond the distant end of the line section. Reclosure to a dead line is from the heavier source end first, with synchronism check from the lighter source. A three terminal line without carrier has its relays set sensitively to overreach, especially by the distance relays at the middle terminal. Even though this is done they seldom do actually overreach. Most of our three terminal circuits however, are now protected by distance directional carrier. Also carrier relays protect a short heavy capacity tie line, if this line's high settings would force upward, those at adjoining stations. Each bus must be seen as an instantaneous bus when viewed by relays facing into this bus from the adjoining distant station. Almost all our double circuit tower lines are now six conductor lines using only two breakers.

"With these precautions and high speed relays we have very few unexplained tripouts on the 110-kv or 19-kv networks. . . . "

C. W. Cogburn and G. C. Kelley, Florida Power and Light Co., Miami, "Application of Underfrequency Relays for Automatic Load Recovery":

"Two methods may be employed in an electric system to reduce overloads on generating stations during a system disturbance in order to prevent a complete shutdown of the system: manual, and automatic.

"Which of the above methods to use may be readily determined by asking what the greatest rate of change of frequency that can result on a particular system. Obviously, a small system with heavy ties with loads approximating 200 per cent the system generation would be expected to have a faster rate of frequency decay than a large system where the load may be 125 per cent of the system generation. In the latter case, manual operation may be used if the operators can be relied upon to reduce overloads on the generation equipment before the frequency drops to a value unsafe for operation of the plant auxiliaries. Manual operation would probably not be fast enough to save the system from a complete shutdown should a severe overload occur and, therefore, automatic load reduction should be employed. . . . "

The authors then described an underfrequency relay with approximately six cycles over-all operating time. They reported that this relay could be used advantageously on tie lines to initiate system splitting; at generating plants to initiate system splitting such as auxiliary busses, initiate load shedding, and frequency monitoring; at bussed substations to initiate system splitting, and load shedding; and at tapped load substations to initiate load shedding.

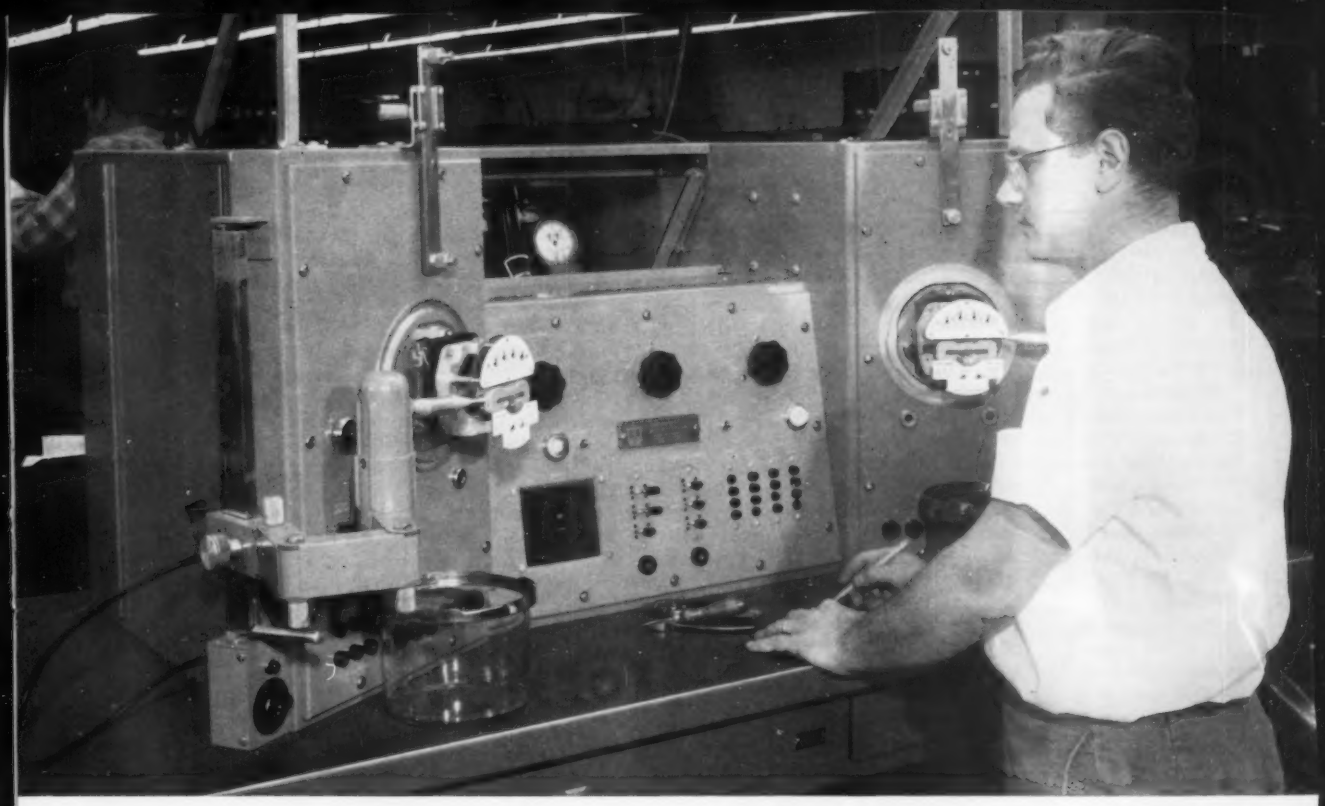
They pointed out that the rate of decay of system voltage and frequency will vary with the number of tie lines, the complexity of the system disturbance, and the type of system, and that with such complexities and variables, the underfrequency relay properly applied is a very useful tool for the application of automatic load recovery.

C. P. Almon, Jr., chief power systems operations branch, Tennessee Valley Authority, Chattanooga, "Load Shedding":

"The need for load shedding usually arises when there has been a loss of generation on part of a system and the load cannot be supplied by the remainder of the available generation and tie lines. Common causes which result in a loss of generation to a part of the system are the loss of a critically loaded intrasystem tie or the loss of a tie to another power system. . .

"On our system we make studies on the effects of loss of certain generating capacity while operating independently. These studies are helpful in arranging a load-shedding program."

Mr. Almon also pointed out that the need for load shedding can be minimized by the use of admittance relaying and fast reclosing schemes.



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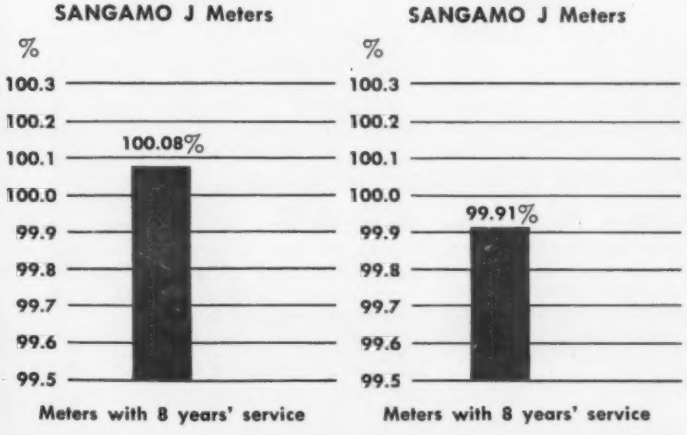
Such sustained accuracy is characteristic of Sangamo Watthour Meters. And such sustained accuracy is the reason why the J2 is your best investment in a watthour meter.

Actual performance records of 20,688 J Meters after 8 years service



SANGAMO ELECTRIC COMPANY

SPRINGFIELD, ILLINOIS

JH57-3

"With the development of the admittance-type distance relays," he said, "used with carrier pilot relaying, it is now possible to discriminate very closely between line faults and line overloads. It is also possible by the use of a timing device to discriminate between tripping for line faults and tripping because of instability, thereby preventing reclosing when reclosing would not only be ineffective but could compound the disturbance.

"The relaying schemes are all designed with the idea of keeping as much of the system intact at all times as possible. Admittance-type relays and high-speed reclosers make it possible to keep the system intact except in case of permanent trouble; but, if there is permanent trouble, as small an area as practicable is isolated. Thus the load shedding is kept to a minimum, while the larger area of the system is protected."

Mr. Almon summarized his discussion as follows:

"The basic application of load shedding, automatic or manual, is to arrange the protection so that a major trouble will be isolated, leaving the larger part of the system operating.

"Experience on our system has indicated that automatic load-shedding devices have been very helpful in reducing the effects of disturbances to the point where recovery is not too difficult. It is much easier to recover from a trouble if a part of the system remains to aid in the recovery.

"Interconnections aid in reducing the severity of a system disturbance and should be protected at all times.

"The scheduling of adequate reserve capacity for load variations will reduce the probability of the need for load shedding but will not preclude it.

"Studies are made to show what conditions would exist if certain key generating plants were relayed because of trouble.

"Good customer relations aid in load reductions on an emergency basis.

"As the size of systems increases, the frequency at which underfrequency relays trip should be increased."

G. D. Rockefeller, Westinghouse Electric Corp., Newark, N. J., "Single-Phase Directional Unit Connections":

In this presentation, the author reviewed the connections and performance of phase directional units and summarized the reasons for standardization on the 90°-60° connection method.

"All factors considered," he said, "the only practical possibility for undesired tripping with 90°-60° occurs when the relay current is predominantly zero sequence. This condition can be handled by using auxiliary current transformers to filter zero sequence current out of the phase relays. . . .

"It should be emphasized that field experience justifies neither a review of existing installations, nor individual study of new applications to determine if directional unit operation will be correct, except where undesired tripping has occurred. That is, the possibilities are remote that trouble will be encountered, and therefore, engineering effort can be better spent elsewhere."

E. B. Henry, relay engineer, Gulf Power Co., Pensacola, Fla., "Relation of Vector Diagrams to Electrical Apparatus Connections":

In this comprehensive presentation, Mr. Henry reviewed the fundamentals of vector relationships with respect to electrical apparatus connections, dividing the subject into three parts—transformers, meters, and relays. Besides serving as a refresher on this important phase of relay engineering, his paper will have considerable value in training technicians in metering and relaying.

Distribution relaying

The special symposium on distribution relaying practices included case history discussions on methods used by Knoxville Utilities Board, Carolina Power and Light Co., and City of Jacksonville, Fla.

R. A. Bailey, Knoxville Utilities Board, Knoxville, Tenn., "Knoxville's Distribution Relaying Practices":

In discussing the protection of 13 kv lines, Mr. Bailey reported that "the average number of operations of 13 kv circuit breakers on our system is four to five per breaker per year. About 80% of these operations are initiated by instantaneous relay. We find the instantaneous relay a very valuable tool in our distribution relaying practices.

"A great number of our distribution transformers are protected by spill gaps rather than by lightning arresters. These are not self-clearing devices, and it is necessary to interrupt the circuit to clear them. We depend on single phase oil circuit reclosers for this job in most instances. These gaps cause the number of recloser operations on the system to be rather high.

"For the last two years the reclosers on the system have averaged 15 operations per recloser per year. On the other hand, the per cent lockouts to total number of operations is rather small—slightly less than one and one-half per cent. The use of gaps on parts of circuits protected only by station breaker is avoided wherever possible. . .

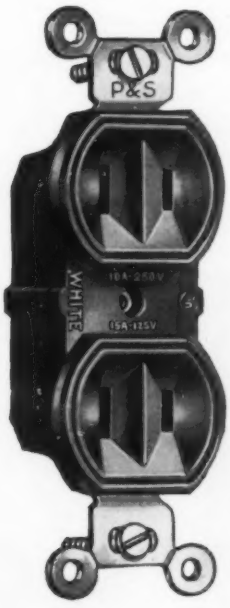
"A vital part of our distribution relaying practice is maintaining records on system performance. System outages are checked to determine that (1) the proper relays operated to clear the circuit, (2) the proper recloser operated if lockout occurred, and, (3) the proper fuse blew. At the end of the year a summary is prepared showing by voltage class (1) breaker operations, (2) the number of lockouts, (3) recloser operations, (4) recloser lockouts, and (5) fuses blown. Tabulations showing causes of breaker and recloser lockouts and blown fuses are also made. These summaries are made from data taken on each circuit. The evaluation of this information is very helpful in determining which circuits and sectionalizing points need improvement.

Wayne Burch, Carolina Power and Light Co., Raleigh, "Distribution Feeder Protection Coordination":

"The first thing needed in studying the coordination of distribution feeder protective equipment is an accurate map of the feeder drawn to scale. Such a drawing gives, at a glance, a good picture of the problem and is of considerable help in selecting the locations for sectionalizing devices. Important points on the feeder and its branches are marked by a series of letters or symbols in order that these points may be identified on the impedance diagram on the study sheet. The map shows wire data and distances for the various sections of line, and when space is available, other data such as opening points, important loads, bad

(Continued on page 108)

1501



1500

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FAST, EASY WIRING WITH PRESSURE TERMINALS

There's real easy wiring ahead when you specify the P&S 1501 Switch and the P&S 1500 Duplex Specification Type Outlet, both with time-saving pressure terminals. Wires are locked in automatically, held by strong phosphor bronze springs, cannot loosen due to vibration. The outlet has double torsional contacts that give "long line" contact with minimum heat. Both devices mean a quicker, easier, more profitable operation on every residential job!

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MAKE THE COMPLETE JOB COMPLETELY P&S

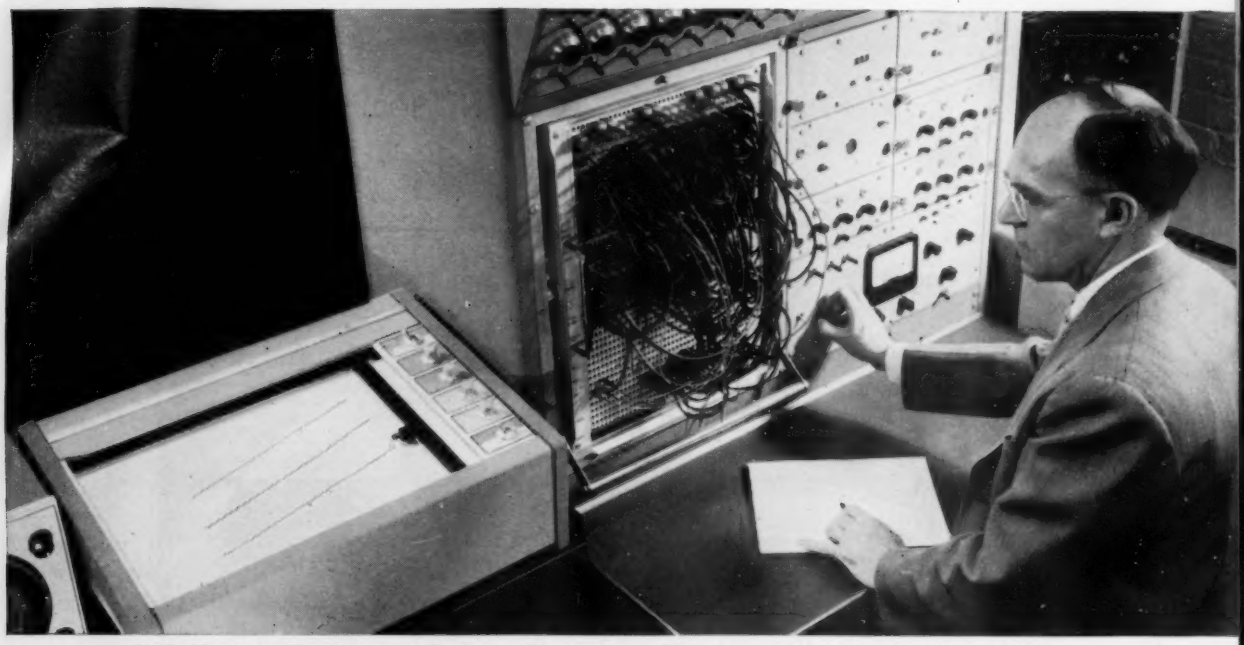
***PROVED:* WESTINGHOUSE *URL* AND *URF* REGULATORS**

Limit voltage error to 1/3 that

PROBLEM: Determine the combination of regulator components that will provide best regulation with greatest reliability, least maintenance

APPROACH: Analog computer to simulate operation of various controls and tap changers, and to evaluate the performance under conditions found on utility systems

ANSWER: Combination of 1¼% steps, inverse time delay, instant-response tap changer



H. L. Prescott, Development Engineer, Westinghouse Transformer Division, obtains regulator performance data with the analog computer. Conditions of an actual distribution system are reproduced—voltages of various characteristics are generated and applied to simulated regulators.

Extensive studies at Westinghouse with the analog computer have proved this fact of outstanding importance to every electric utility . . . the Westinghouse system of 1¼% step voltage regulation holds set voltage with ½-⅓ the voltage error of any other regulator! Tests compared two major systems (table, right) of step regulator operation, with a ± 1-volt setting, under the three basic supply voltage conditions—smooth changes, large and rapid changes, irregular changes. Results proved that the ability of a regulator to hold a set value is dependent on the kind of voltage sensing device, time delay control and tap changer. Results proved—and without exception—that Westinghouse 1¼% step regulation holds narrowest effective bandwidths, regardless of individual system characteristics.

To the utility, Westinghouse regulation means greater revenue for these reasons:

1. From feeder to customer—fewer operations, fewer regulators, minimum total regulation equipment expense.
2. Satisfactory voltages can be furnished farther out on the line without reregulation.
3. Heavier loading of existing lines is practical.

COMPARE:

A—Westinghouse regulators with 1¼% steps, inverse time delay, instant-response tap changer

B—Other regulators with ⅝% steps, fixed time delay, 7-second tap changer operation

Regulator	Set Time Delay	Maximum Voltage Error	Voltage Error Average
A	minimum	1.15	.20
B	15 second	1.22	.62
A	average	1.21	.25
B	30 second	1.28	.65
A	maximum	1.23	.29
B	60 second	1.34	.63

# of other regulators

G. K. Anderson, Voltage Regulator Sales, points to URL regulator whose superiority has been proved in service through thousands of installations for over ten years.

WESTINGHOUSE URL AND URF DISTRIBUTION VOLTAGE REGULATORS MEAN 42% FEWER OPERATIONS, 15% LESS CONTACT EROSION, FAR LESS MAINTENANCE

Providing these and many other advantages, the following features give you, altogether, the most practical regulators you can buy.

- Instant-response tap changer operates 15 times faster than other tap changers.
- Direct-drive Geneva gear mechanism provides optimum contact speed—eliminates flashover, minimizes contact burning, reduces erosion and carbonization.
- Load range selector—allows higher currents at reduced range operation; you get increased capacity to 160% of rated current at ± 5% regulation up to 400 amps.
- Coastal finish and single-bolt tank construction with no external hardware—maximum protection against corrosion.
- Separate tap changer oil compartment keeps metal and carbon from tap changer out of core and coil—eliminates core and coil maintenance.
- Unique new CVR relay with integral, adjustable, inverse time delay in drawout Flexitest* case.
- Unit assembly of core, coil and tap changer.
- Draw stud bushings with single-bolt cover simplifies untanking (though rarely necessary).

*Trade-Mark

NEW URF STEP VOLTAGE REGULATOR, DEVELOPED AS A RESULT OF THESE EXTENSIVE STUDIES, HAS THESE ADDITIONAL FEATURES:

1. Higher current ratings—extends range of 1¼% step regulator.
2. Built for feeder application—reduces your initial investment for regulators up to 167 kva.
3. Provisions for hand operation.
4. Bridging-type contacts with magnetic yoke eliminate pitting under short circuit, provide maximum mechanical strength.

J-70819

YOU CAN BE SURE...IF IT'S Westinghouse

Notes on new utility equipment

Snap-slot wiring duct reduces assembly time

A NEW low-cost plastic wiring duct manufactured by Panduit Co., 10132 South Washtenaw Ave., Chicago 43, Ill., reduces control panel wiring time to an absolute minimum. The duct, which requires no special fasteners, features an exclusive snap-in open slot design which allows wires to be

installed in the duct with lugs already attached. The snap-in design completely eliminates the time-consuming operation of threading wire through duct holes.

To insert a wire, you simply pull out the plastic finger separating the slots, lay the wire in the duct, and release the finger. Installation is further simplified by a duct cover which is snapped in place on the duct after wires are laid. Wires are therefore securely contained but completely accessible for trouble-shooting and revisions.

The duct is also available in an overlapping closed-slot design which allows wire insertion over full length of the duct with no dead spots. Duct and cover are non-flammable dark grey vinyl plastic meeting J.I.C. specifications. Cutting is easily accomplished with snips or ordinary wood cutting tools.

For additional data, ask for item U-701, using the coupon on page 117.

Higher ratings now for step regulators

EXTENSION of its line of 16-step, single-phase regulators to higher ratings with introduction of a new type URF regulator has been announced by Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

The new ratings are available up to and including 100 kva at 2500 and 5000 volts, 167 kva at 7620 volts, and 138 kva at 13.8 kv.

The regulator has a load range selector that enables selection of exact voltage regulation range to suit the load current of the feeder being regulated. The URF regulator, as well as the existing URL for lower ratings, have the following features:

Direct Geneva gear drive that provides instant tap changer operation, permitting traverse from full buck to full boost in less than 13 seconds. This, plus inverse time delay and 1¼ per cent steps, results in faster correction of severe voltage changes and gives a narrower effective voltage band width.

Routine cleaning and maintenance of core and coils is eliminated. A separate tap changer compartment keeps contaminating products formed during tap change out of core and coil.

Tank cover is secured by a single bolt through its center, eliminating all external hardware. Draw studs in bushing combined with single-bolt cover simplify untanking procedure although this is rarely necessary because tank is sealed and oil cannot become contaminated.

Tap changer contacts can be inspected easily through handhole in cover, eliminating need to raise unit

out of tank. In addition, the URF regulator has a crank for emergency hand operation. Only 2-2/3 crank revolutions are required for a tap change.

For additional data, ask for item U-702, using the coupon on page 117.

Demand meter kit for load surveys

A DEMAND meter kit for use by utilities in making load surveys on feeders for planning guidance has been announced by Allis-Chalmers Manufacturing Co., 938 S. 70th St., Milwaukee 1, Wis.

Easily mounted on Allis-Chalmers distribution voltage regulators, the meter responds to the heating effect of the load in amperes—the limiting factor of the circuit capacity.

A current transformer which steps up the control current to the desired meter current is mounted inside the meter. This current transformer has two taps which make it possible to read either 3 amperes or 6 amperes full scale deflection. The taps can be changed by two metal strips on the rear of the meter.

For additional data, ask for item U-703, using the coupon on page 117.

Direct-current Hypots test to 75,000 volts

THREE new mobile type d-c Hypots for high-potential testing of high-voltage cables, insulation materials, large rotating machinery and related high-voltage equipment are available from Associated Research Inc., 3758 Belmont Ave., Chicago 18, Ill. Ranges of the hypots in kv d-c are: Model 5265, 0-15, -30, -45; Model 5275, 0-70; Model 5280, 0-25, -50, -75. Current ranges of all three models in microamps are 0-50, -250, -500.

Low-ripple d-c output is obtained by use of the exclusive Amplivolt power unit, a rectifier-amplifier employing long-life selenium rectifiers which contain kilovoltmeter multipliers to keep all high potential circuit components oil-insulated and corona-free. No rectifier tubes or filament transformers are used. Amplivolt power unit permits use of relatively low-voltage dry-type input transformers.

Metering of both voltage and current is of actual output. Voltmeter measures voltage directly across HV

output and indicates actual voltage applied, regardless of regulation or test circuit conditions. Microammeter is connected in the ground side of output return line and is overload protected.

More accurate leakage current

North American F-100 Super Sabre
—backbone of the nation's
supersonic air superiority

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First operational plane capable of supersonic speed in level or climbing flight, the F-100 Super Sabre is a product of North American Aviation Inc., builder of more airplanes than any other company in the world. We are proud that North American is a Carol Cable customer.

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Serving industry for more than 30 years

measurements are possible with an unique output return metering circuit. Metering of load (leakage) or bypass (guard) currents may be done selectively as tests require. Controls on the sloped panel are simple and incorporate safety interlocks to prevent accidental energizing of test circuits.

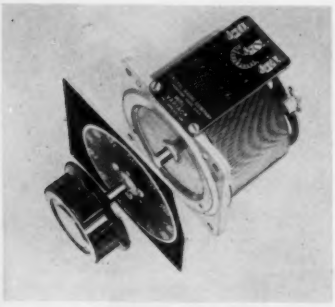
For additional data, ask for item U-704, using the coupon on page 117.

New Variac units added to General Radio line

MORE WATTS per dollar and more watts per pound are the important features of Type W5L and Type W50 Variacs recently introduced by General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.

The Type W50, largest unit in the Variac line, replaces the older Type 50 and is available in a complete series including 115-volt and 230-volt models, cased and uncased units, and ganged assemblies. Current ratings are increased over the older models. The new rated currents are 50 and 25 amperes (40 and 20 amperes for previous models) for the single 115-volt and 230-volt models, respectively. Motor drives are available in several speeds for all W50 models.

Further down the power scale, the Type W5L has been designed for those 115-volt 60-cycle applications where the usual Variac over-voltage feature is not needed. By limiting the maximum output voltage to the line

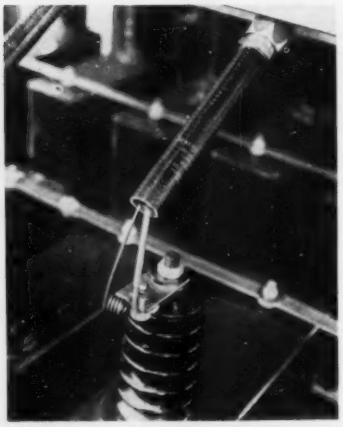


voltage and frequency to 60 cycles, it is possible to use larger wire and still keep other physical dimensions identical with other Type W5 Variacs. The Type W5L can control loads drawing up to 11 amperes at line voltage, thus giving the Variac an output power rating of over 1¼ KVA. Up to 8.5 amperes can be drawn from the unit at any voltage.

For additional data, ask for item U-705, using the coupon on page 117.

Capacitor stack fuse isolates faulty units

A NEW HIGH voltage fuse with 3.3 times the 60 cycle interrupting capacity of its predecessor is now



standard with stack rack capacitor equipments utilizing 50-kilovar units manufactured by General Electric Co., Schenectady 5, N. Y.

The fuse, designated 9F9D-9, isolates faulty units, allowing a capacitor bank to continue operation without danger of rupturing a failed capacitor.

A fiber glass tube wall gives the fuse superior mechanical strength and a high degree of resistance to natural elements. This tube strength provides satisfactory operation of the fuse when the stored energy of an adjacent capacitor is four times greater than previously permitted.

It is installed by screwing one end into the buswork of a bank of equipment. A lead from the fusable element extends from the other end and is attached to the capacitor terminal. The 9F9D-9 fuse is rated 8.7-kilovolts, 4,000 amperes.

For additional data, ask for item U-706, using the coupon on page 117.

Line construction truck for city utility operation

THE MODEL 3022 line construction truck manufactured by the White Motor Co., Cleveland, Ohio, introduces special features which make it ideal for city operation by utilities. It is equipped with a special body designed for use in line construction work. The body has a heated crew

compartment and extra space for tools, tackle and supplies. Both winch and pole derrick are provided, the one is driven off of the main five speed transmission, while the other takes its power from an auxiliary transmission.

The low step-in height of cab, its roominess and excellent vision make for driver comfort and safety, accommodating larger crew. The power-tilt-forward feature of the cab provides easy access to radiator, motor, clutch and transmission and results in time saving, lower maintenance cost and improved quality of work. The cab tilts forward in 25 seconds.

Excellent maneuverability is made possible by the shorter overall length, wider tread front axle and short turning radius provided in the White 3000 Series.

For additional data, ask for item U-707, using the coupon on page 117.

Portable variable transformer for low wattage applications

THE PORTABLE POWERSTAT variable transformer being manufactured by The Superior Electric Co., 83 Laurel St., Bristol, Conn., incorporated many

features making it ideally suited for laboratory, inspection, classroom and other applications where current requirements do not exceed 1.0 ampere.

Housed in a compact casting only 3½ inches high, 3½ inches in diameter it provides a light, portable variable a-c voltage source for a 0-132 volt, 1.0 ampere, 132 VA output from a 120 volt, 60 cycle, single phase input. Working surfaces can be kept free of unnecessary wiring because of the unique 6 foot cord-plug which provides two receptacles and a 1.0 ampere, 125 V.A.C. fuse housed in the plug end of the cord. Replaces the bulky, heat producing rheostat and other resistance types of control for transistor testers, small motors, heaters, centrifuges, mixers, light source for optical equipment and test apparatus. Has readily accessible "on-off" switch and well-defined dial graduations for fast accurate readings.

For additional data, ask for item U-708, using the coupon on page 117.

Meter secured firmly with locking device

THE SOCKET CINCHER introduced four years ago by F. D. Kees Manufacturing Co., Beatrice, Nebraska, has now been improved so that it can be

continued improvements in 3-phase regulators

CONTROL

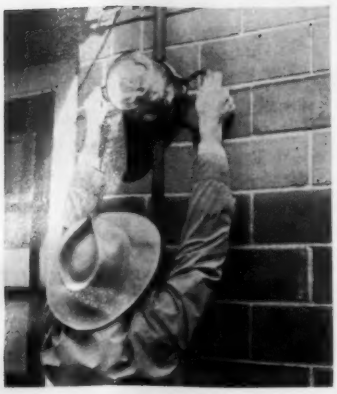
Basic design — long-proved for service and simplicity—remains the same. Recent improvements like these have been added:

- Motor switches are electrically interlocked so that only the raise or lower circuit can be closed at a time.
- All screws, bolts, panel inserts and metal parts are nickel-plated for longer life.
- Stabilizing coil incorporated into solenoid of voltage-regulating relay.
- Rustproof plastic coating on open edges of control cabinet.
- Handy control diagram on inside cover.

These are only a few of the many new features of Allis-Chalmers 3-phase regulators. For further details contact your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

A-5408



used to mount meters on the new G. E. square sockets as well as on the conventional round sockets.

The Cincher simplifies installations by eliminating pounding and the danger of breakage to glass covers. With this new Kees device, the meter is secured firmly and quickly merely by snapping a locking device into place.

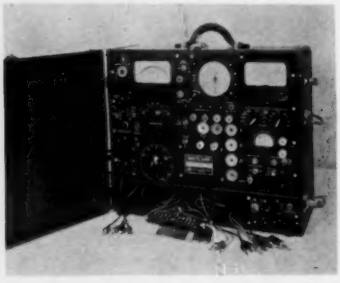
For additional data, ask for item U-709, using the coupon on page 117.

Portable relay tester for all-purpose usage

A SINGLE TEST instrument for complex relays, as well as for a multitude of simple overcurrent and voltage relays has been announced by the Multi-Amp Corp., 465 Lehigh Ave., Union, N. J.

Model 61-V3-DC is a portable self-contained instrument for field or bench testing of practically all types of protective relays, current, differential, distance, impedance, overload, power, product, reclosing, timing, voltage, etc.

Features of the instrument include two independently adjustable current sources for testing differential and directional relays, a voltage output



for voltage relays, an 8 volt DC output for testing relay targets and seal-in units, a 150/300 volt DC output for miscellaneous DC relay testing, continuity indicator for contact action and continuity tests, and separate 1% AC ammeter, AC-DC voltmeter, and DC ammeter.

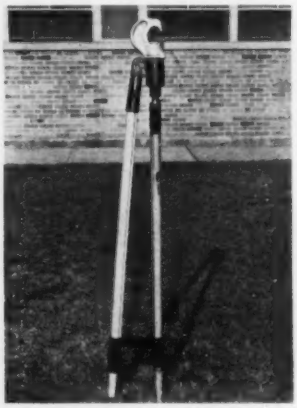
This all inclusive unit weighs only 65 lbs. and measures 18" x 21" x 10½". It has a continuous duty rating of 0.4 KVA, with extensive overload capacities and 4 high current ranges from 0-100 A. at 0-4 V. to 0-12.5 A. at 0-32 V.

For additional data, ask for item U-710, using the coupon on page 117.

Handles equip tools to connect hot lines

INSULATING HANDLES known as HH5 Hotsticks, to adapt the Y35 Hypress hydraulic tool for hot line work, are available from Burndy Corp., Norwalk, Conn. Hotsticks are interchangeable with standard handles of the Y35 Hypress, which installs compression connectors on copper, aluminum, and ACSR cable from #8 through 477 Mcm.

Design of the Hotsticks shortens the overall length of the assembly without decreasing the length of the



insulating handles. They can be quickly substituted for standard handles without use of special parts or tools. Total weight of the Y35 Hypress and Hotsticks is only 17½ lbs.

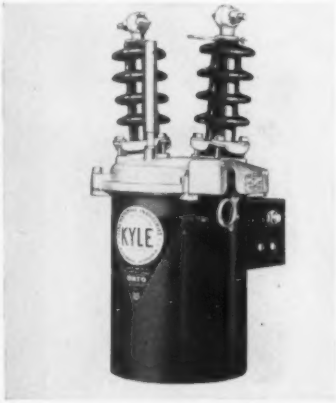
A shotgun-type sliding control rod on the Hotstick assembly lets the lineman release pressure on the connector without taking his hands off the handles. Rubber guards keep his hands from slipping up to the wood portion, while 1½ feet of wood extending beyond the guards help him position the tool on the connector or on the line. An accompanying instruction sheet with action photographs explains the ready interchangeability of Hotsticks with standard Y35 Hypress handles.

For additional data, ask for item U-711, using the coupon on page 117.

Oil sectionalizers rated to 140 amperes

THE AUTOMATIC oil sectionalizers now being produced by Line Material Industries, McGraw Edison Co., Milwaukee 1, Wis., have higher continuous current and short-time current ratings. Newly designed contacts have made possible a continuous-current rating increase of 180 per cent — from a former maximum of 50 amperes to a new maximum of 140 amperes. Current ratings of 5, 10, 15, 25, 35, 50, 70, 100, and 140 amperes are now available. Short-time current ratings range to 1800 amperes for ten seconds, to 4000 amperes for one second, and to 6500 amperes of momentary asymmetric current. The new sectionalizers are rated at 14.4 kv but can be applied to systems of 2.4 through 14.4 kv.

Designated type GH, the new sectionalizers are designed to provide improvements in service continuity

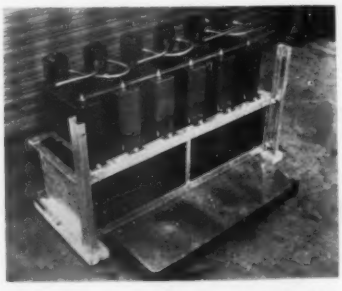


by making possible additional recloser-sectionalizer applications. The sectionalizers will simplify coordination of a system's overcurrent protective devices. Sectionalizer ratings match every rating of Kyle recloser types H, 3H, 4H, and 6H. GH sectionalizes can also be used with Kyle recloser types L, E, R, and the new type W, within the limits of the sectionalizer voltage and current ratings.

For additional data, ask for item U-712, using the coupon on page 117.

Grounded U-G type capacitor for limited pole-top space

METAL-ENCLOSED, submersible high voltage capacitor equipment has been developed by the General Electric Co., Schenectady 5, N. Y. For appli-



cation where pole-top space is limited, the equipment has three easily connectable leaded cables, and can be grounded for better protection of operating personnel.

For additional data, ask for item U-713, using the coupon on page 117.

THE MAGAZINE

For

SOUTHERN

ELECTRICAL MEN

Is . . .

ELECTRICAL SOUTH

Each month thousands of men engaged in the electrical industry throughout the South-Southwest meet through the pages of ELECTRICAL SOUTH for discussion and solution of mutual problems . . . presentation of new ideas and suggestions.

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CLIP AND MAIL HANDY RENEWAL COUPON ON PAGE 118 TO

ELECTRICAL SOUTH

806 Peachtree St., N.E.,

Atlanta 8, Georgia

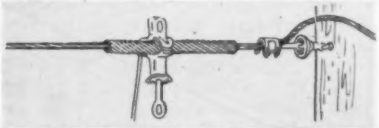
6 WAYS TO PROTECT OVERHEAD TRANSMISSION AND DISTRIBUTION LINES WITH FANNGRIPS

ARMOR RODS

To protect and strengthen lines at points of maximum stress or where wear or breakage is likely to occur.

LINEGUARDS

Economical conductor protection where short conductor spans and low tensions are used.



TAP ARMOR

Provides maximum line protection on long spans at the points of clamp attachment.

PATCH RODS

For open-span repairs, where conductor damage is minor and is confined to the wires of the outer layer.

PLASTIC FANNGUARDS

Protect wire coverings and prevent tree abrasion to overhead lines.

FANNGRIPS

Made of galvanized steel, aluminum alloy or copperweld. Powerful non-slip grip makes them ideal for conductor dead-ending, guying or for service drops.

FANNER *Superformed* **PRODUCTS**

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WRITE FOR LITERATURE

THE FANNER MANUFACTURING COMPANY

Electrical Products Division

Fine Fanner Superformed

BROOKSIDE PARK • Established 1894 • CLEVELAND 9, OHIO

Telephone: SHadyside 1-6000

AGENTS and DISTRIBUTORS IN PRINCIPAL CITIES

NOW . . . through its Plastic Division, **FANNER** offers a wide variety of **INSULATING TUBINGS** and **MOULDINGS** for electrical purposes.

New, revised estimating tables continued in this issue

A NEW SERIES of estimating tables, completely revised in the light of more recent jobs and experience, are presented in this issue and will appear from month to month in forthcoming issues. These electrical estimating data sheets cover labor only and are arranged alphabetically with the basic material headings as a title for each tabulation.

Labor units given in these tabulations are based on a minimum of interference during work progress. The averages listed do not provide for abnormal job conditions, and any such abnormal conditions will require adjustments by the user, based on his experience.

The work units covered by each table are composed of one or more separate but closely related operations necessary for the complete installation of a particular basic item of electrical equipment. These operations associated with the basic material are described at the bottom of each table.

Most of the electrical estimating tabulations follow the same form. Column 1 at the left shows the size of the material to be installed. The second column from the left gives the time required to install the material, and it should be noted especially that this "productivity" column may be based on individual units or in the case of cable or conduit on units of 100 feet or 1,000 feet. The abbreviations "Ea." for each, "C" for hundreds, and "M" for thousands in Column 2 indicate the basis of the labor hours.

Columns 3 to 13, from the left, give the actual labor costs in dollars per unit of installation, at various hourly wage rates.

When calculations are being made for an hourly wage rate that doesn't correspond to any of the rates listed in Columns 3 to 13, the user may multiply the number of hours in Column 2 by 100 and this will give the labor cost based on an hourly wage rate of $1 per hour. By multiplying this by the hourly wage rate that actually applies in the user's locality, the exact labor cost of the operation may be obtained. Labor costs obtained in this way will be for units, hundreds of feet, etc., as given in heading of Column 2 of the table.

The labor units covered by the tables represent direct job labor costs and do not include delivery of material to site, engineering, estimating, or any other indirect cost.

As will be noted, some of the electrical estimating tabulations to be given will be for independent operations, such as excavating, backfilling, etc. These are included for use in preparing estimates on work of a special nature not covered under a specific table heading.

Tables will appear in alphabetical order.

CONCEALED

CONDUIT "IN CONCRETE SLAB" STORES - THINWALL

COND. SIZE	HRS "C"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	3.9	.048	.057	.067	.076	.086	.095	.105	.114	.124	.133	.143
3/4"	4/1	.051	.062	.072	.082	.092	.103	.113	.123	.133	.144	.154
1"	4.6	.058	.069	.081	.092	.104	.115	.127	.138	.15	.161	.173
1 1/4"	6.2	.078	.093	.109	.124	.14	.155	.171	.186	.202	.217	.233
1 1/2"	7.7	.096	.116	.135	.154	.175	.193	.212	.231	.25	.27	.289
2"	8.5	.106	.128	.149	.17	.191	.213	.234	.255	.276	.298	.319
		RIGID										
1/2"	4.3	.054	.065	.075	.086	.097	.108	.118	.129	.14	.151	.161
3/4"	4.6	.058	.069	.081	.092	.104	.115	.127	.138	.15	.161	.173
1"	5.3	.066	.08	.093	.106	.119	.133	.146	.159	.172	.186	.199
1 1/4"	7.	.088	.105	.123	.14	.158	.175	.193	.21	.228	.245	.263
1 1/2"	8.7	.109	.131	.152	.174	.196	.219	.239	.261	.283	.305	.321
2"	9.9	.122	.147	.172	.196	.221	.245	.270	.294	.319	.343	.368

C-102-B

LABOR: Includes handling material at site, bending, cutting, reaming and threading, placing conduit, tying down and connecting at terminus.

7-57

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in the long run... it's O.Z.

Type AX

Provides 4" expansion, contraction movement. Malleable iron head, body Hot Dip Galvanized. Weathertight head sealed by factory-installed high grade graphite packing. Insulating conduit end bushing eliminates cable abrasion. 10 sizes for conduit ½" to 4" diameters.

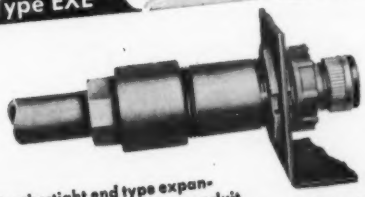
Type EX

Permits 8" conduit movement. Optional length sleeves, additional cost. Weathertight head sealed by factory-installed high grade graphite packing. Insulating bushings prevent cable abrasion. Hot Dip Galvanized finish. 13 sizes for ½" to 6" conduit diameters.

Type EXDS

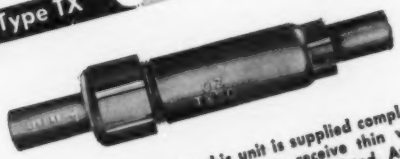
Compensates for deflection, expansion, contraction. ¾" movement all directions from normal; 30° angular movement. Also used as vibration damper between conduit sections. 10 sizes.

Type EXE



Weathertight end type expansion fitting. Designed for conduit terminating in junction box, where expansion, contraction take place. Supplied complete: locknuts, bushings. Standard finish, Hot Dip Galvanized. 13 sizes.

Type TX



Similar to the Type AX, this unit is supplied complete with extension nipples, ready to receive thin wall couplings. Standard finish is cadmium plated. Available in 6 sizes for conduit ranging from ½" to 2".

for the longer line of EXPANSION FITTINGS

In the long run, no line of conduit is more dependable than its components. When it comes to dependability in expansion fittings, look to O. Z. as the line that measures up! Five basic types provide the dependable answer to your fitting problems in conduit expansion, contraction, and deflection. O. Z. is the dependable line because it's the line with the *right size*, the *right type*, for every requirement!

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND STREET • BROOKLYN 17, N. Y.

- CAST IRON BOXES
- CABLE TERMINATORS
- POWER CONNECTORS
- SOLDERLESS CONNECTORS
- GROUNDING DEVICES
- CONDUIT FITTINGS
- INTERLOCKED ARMOR CABLE FITTINGS

Sales Office and Warehouse: 406 So. Cicero Avenue, Chicago 44, Ill. • ESterbrook 9-0326
Office and Factory: 749 Bryant Street, San Francisco 7, Calif. • GArfield 1-7846

CONDUIT (THINWALL) "IN CONCRETE SLAB" ** WAREHOUSES

CONCEALED CONDUIT SIZE	HRS. "C"	LABOR COST INSTALLED PER FT. @ FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	3.3	.044	.050	.058	.066	.074	.083	.091	.099	.107	.116	.124
3/4"	3.7	.046	.056	.065	.074	.083	.093	.102	.111	.12	.13	.139
1"	4.3	.054	.065	.075	.086	.097	.108	.118	.129	.14	.151	.161
1 1/4"	5.2	.073	.087	.102	.116	.131	.145	.160	.174	.189	.203	.218
1 1/2"	7.3	.091	.110	.128	.146	.164	.183	.201	.219	.237	.256	.274
2"	9.3	.116	.14	.163	.186	.209	.233	.256	.279	.302	.325	.349
		RIGID										
1/2"	3.9	.049	.059	.068	.078	.088	.098	.107	.117	.127	.137	.146
3/4"	4.2	.053	.063	.074	.084	.095	.105	.116	.126	.137	.147	.158
1"	5.	.063	.075	.088	.10	.113	.125	.138	.15	.163	.175	.188
1 1/4"	6.7	.084	.101	.117	.134	.151	.168	.184	.201	.218	.234	.251
1 1/2"	8.4	.105	.126	.147	.168	.189	.21	.231	.252	.273	.294	.315
2"	10.6	.133	.159	.186	.212	.239	.265	.292	.318	.345	.371	.398

E-102-B

LABOR: Includes handling material at site, bending, cutting, reaming & threading, placing conduit, tying down & connecting at terminus.

7-57

Electrical Estimating—III

CONDUIT "ON CONCRETE SLAB" STORES
THINWALL

CONCEALED

COND. SIZE	HRS. "C"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
1/2"	3.6	.045	.054	.063	.072	.081	.09	.099	.108	.117	.126	.135
3/4"	3.9	.049	.059	.068	.078	.088	.098	.107	.117	.127	.137	.146
1"	4.4	.055	.066	.077	.088	.099	.11	.121	.132	.143	.154	.165
1-1/4"	5.8	.073	.087	.102	.116	.131	.145	.160	.174	.189	.203	.218
1 1/2"	7.2	.09	.108	.126	.144	.162	.18	.198	.216	.234	.252	.27
2"	9.1	.101	.122	.142	.162	.182	.203	.223	.243	.263	.284	.304
		RIGID										
1/2"	4.1	.051	.062	.072	.082	.092	.103	.113	.123	.133	.144	.154
3/4"	4.4	.055	.066	.077	.088	.099	.11	.121	.132	.143	.154	.165
1"	5.1	.064	.077	.089	.102	.115	.128	.14	.153	.166	.179	.191
1 1/4"	6.7	.084	.101	.117	.134	.151	.168	.184	.201	.218	.235	.251
1 1/2"	8.3	.104	.125	.145	.166	.187	.208	.228	.249	.27	.29	.311
2"	9.3	.116	.14	.163	.186	.209	.232	.256	.279	.302	.326	.349

E-102-B

LABOR: Includes handling material at site. Bending, cutting and threading, placing conduit, tying down and connecting at terminus.

7-57

Electrical Estimating—III

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Ask your distributor for Youngstown Buckeye Full Weight Rigid Steel Conduit and Youngstown Electrical Metallic Tubing.

When the new addition and remodeling of Employers Mutual Casualty Company's existing office building in Des Moines, Iowa, was planned, Youngstown's "Buckeye" Full-Weight Rigid Steel Conduit was wisely specified to provide life-time positive, safe protection for the electrical wiring system.

If safe and efficient functioning of your electrical systems—in any location, under any condition—presents a problem, then Youngstown "Buckeye" Conduit should be specified. Satisfied users across the nation report to us: "It's much easier to bend and thread—wire fishing is less troublesome—and because its corrosion resistance is superior, we get a much longer service life."

"Buckeye" Conduit is fast becoming the specification of leading building owners, architects and contractors—why not make it yours?

Delivering is no problem—as all the better distributors in electrical and industrial markets carry complete and ample stocks. Their quick, courteous service is yours for a phone call, anytime.

YOUNGSTOWN "BUCKEYE" CONDUIT

. . . provides permanent wiring protection for remodeled Iowa building

Employers Mutual Casualty Co. Bldg., Des Moines, Iowa
Architects & Engineers: Childs & Smith, Chicago, Ill.
General Contractor: Weitz Construction Co., Des Moines, Iowa
Electrical Contractor: Weston Lighting Co., Des Moines, Iowa

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

THE YOUNGSTOWN SHEET AND TUBE COMPANY
Manufacturers of Carbon, Alloy and Yoloy Steel
General Offices - Youngstown 1, Ohio
District Sales Offices in Principal Cities

News of the industry

edited for Southern readers

Generating capacity increased by MP&L

CONSTRUCTION of a $25 million addition which will step up generating capacity more than 150 per cent was begun recently by the Mississippi Power and Light Company at its Rex I. Brown station in Jackson, Miss.

The new plant will generate 385,000 kilowatts, making it the largest in Mississippi and one of the largest in the South, according to Henry A. Maddox, executive director of the Mississippi Agricultural and Industrial Board. By early 1959 the new unit will be in full operation serving industry and homes in 512 communities in the western part of Mississippi.

At the recent dedication ceremonies MP&L board chairman Rex I. Brown declared that the company "must always take the lead in building for tomorrow so that no person or industry will turn away from Mississippi for want of adequate power."

Mississippi Power and Light is part of the Middle South interconnected system of four companies in Arkansas, Louisiana and Mississippi. Transmission lines of these companies are interconnected with each system operating separately but interchanging power. Since 1945, the company's total customers have increased 104 per cent and total load almost 400 per cent.

When operating at capacity, the new plant will use the equivalent of 50 carloads of coal daily. More than one million man hours will be required for its construction and about $10 million will be spent in Mississippi for labor and materials.

Lighting sales challenge is 400 per cent increase

A 400 PER CENT increase in sales of home lighting fixtures by 1961 was called a practical possibility, if the entire electrical industry adopts a three-point "tell 'em, show 'em, sell 'em" program. This was urged before the recent annual convention of the National Association of Electrical Distributors at the Sheraton-Park Hotel, Washington, D. C.

Ted Cox, managing director of the American Home Lighting Institute told the convention that 36,000,000, or 80 per cent of all homes, are far below the lowest minimum lighting standards.

"These homes," he said, "are the lighting industry's biggest market. In addition, even a slight increase in the number of fixtures installed in new homes will more than make up for the fall-off in new home starts.

"Currently moving at a $93 million a year sales clip, the home lighting fixture industry can expect to increase sales 400 per cent by the end of 1961 if the industry does three things.

"First, we must conduct an enormous public relations, educational, and promotional program to create homeowner demand for good fixture lighting. We must also create the desire to fill that demand on the part of electrical contractors and home builders.

"Second, we must provide showrooms where people can see lighting fixtures, get advice on lighting, and buy the fixtures.

"Third, we must train an active force of lighting merchandisers and salesmen to convert all of the market development action into concrete sales."

NAED forms electronics task force committee

AN INDUSTRIAL electronics task force committee has been formed within the National Association of Electrical Distributors.

The special committee, a part of the association's motors and industrial controls committee, has been appointed to study developments in the industrial electronics field. It will report on information which would be helpful to the NAED membership in the wholesale distribution of electronic parts and tubes.

The increasing importance of electronics in the field of industrial controls is expected to become a major factor in electronics distribution in the near future. Many full-functioning electrical distributors presently are engaged in stocking electronic tubes and parts in order to better serve their industrial accounts.

A great many other electrical distributors are reported to be seriously considering adding this equipment to their lines. It was with this view in mind that the NAED motors and industrial controls committee formed this special task force. The committee's first meeting was held during the 49th Annual Convention held recently in Washington, D. C.

Engineers, architects hear store lighting talk

SEVENTY-FIVE electrical engineers and architects from the Mid-South met recently at the plant of Light & Power Utilities Corporation in Memphis, Tenn., to hear Robert Dorsey of Nela Park, Ohio, talk on store designing and shopping center lighting.

Mr. Dorsey is national director of store designing and shopping center lighting for the General Electric Co. The meeting was sponsored jointly by Light & Power, manufacturer of fluorescent lighting fixtures, and by the Memphis Chapter of IES.

A reception was held after the meeting in the L & P display rooms, and their new Ransburg electrostatic spray-painting equipment was in operation for visitors to see.

The fully automatic spray painter uses 100,000 volts. The Memphis firm has two of these machines in operation at the same time. Called the "Ransburg No. 2 Process," the machine is used to paint fluorescent light fixtures. Paint is pumped to a rapidly rotating disc which is charged with high d-c voltage.

The Light and Power Utilities Corp., Memphis, Tenn., uses revolutionary electrostatic spray-painting units to paint fluorescent lighting fixtures.

DECIDEDLY BETTER
DAY-BRITE
Lighting Fixtures

Left to right: Oscar C. Lundberg, vice president, William J. Beran, chief estimator, and James S. Bullied, president, Capitol Electric Company, San Diego, Calif.

More profits than anticipated

"On jobs we engineer, we specify Day-Brite wherever possible. It's always a pleasure to have jobs check out with greater results than anticipated and we can only attribute this to the superior design features of Day-Brite lighting," says Oscar Lundberg.

"Day-Brite's ease of installation and time-saving devices add up to more profits for us. And we're assured our clients receive maximum results and performance from a quality product."

You can take it from Mr. Lundberg, Day-Brite is tops for quality, performance, appearance. And no other fixtures on the market are so thoroughly engineered for quick, simple, economical installation. In fact, you'd think they were actually designed by contractors.

Certified Lighting for a Better America

DAY-BRITE LIGHTING, INC.
5435 Bulwer Avenue, St. Louis 7, Missouri

71195

NATION'S LARGEST MANUFACTURER OF COMMERCIAL AND INDUSTRIAL LIGHTING FIXTURES

E. V. Aldridge J. O. Bell, Jr. J. R. Chambers P. M. Darby R. B. Hood

Appointments at Appleton Electric

IN A POLICY move to realign Appleton procedures for even closer cooperation with the electrical wholesaler, and to offer a more specialized type of divisional marketing program, the Appleton Electric Company, Chicago, Il., has announced the following executive assignments:

Appointed to coordinate the program is Elmer V. Aldridge who joined the Appleton's West Coast office in 1950. In his present capacity as assistant vice-president in charge of sales, he assists F. W. Wehrheim in the supervision of the various sales, order, advertising, and catalog departments with emphasis on coordinating the wholesaler cooperation program.

Newly selected by Appleton to head their respective departments are the following sales managers:

John O. Bell, Jr., sales manager Unilet Division, who has been active in the electrical industry since 1945. He joined Appleton in 1948 in the Southwestern sales division. His impressive performance and knack of cooperating with wholesalers lead to this assignment. He has had practical field experience in the sales and application of almost every item in Appleton's extensive Unilet Division.

James R. Chambers, sales manager Lighting Division, who comes to Appleton from the position of advertising and sales promotional manager with a large manufacturer of lighting equipment. He has been extremely active in the Illuminating Engineering Society and has practical experience both in the sales and engineering level of industrial lighting products.

Phillip M. Darby, sales manager Reelite Division, who has a close familiarity with the details of materials handling, has been active in the Iron and Steel Engineers Association, and has a background of experience with Appleton dating from 1948.

Robert B. Hood, sales manager Pipe Fittings Division, who had an enviable sales record with one of the leading hardware wholesalers before coming to Appleton in 1953. His intimate knowledge of what the wholesaler needs in the way of positive help from the manufacturer and his complete familiarity with the vast number of individual items handled by his division were important factors in his selection to head this phase of Appleton's operations.

GE names industrial equipment distributors

THE CROSS SALES and Engineering Co., 824 Winston St., Greensboro, North Carolina, has been appointed distributor for the General Electric Company's gear motors and transmission components.

According to W. S. Cross, president of the distributor firm, his company will also handle standard types of motors up to 200 hp and general purpose control, in the light industrial class.

The Georgia-Tennessee Supply Co., located at 421 South Green St., in Gainesville, Ga., will handle a similar line, including instruments and transformers. C. F. Hazen, president, announced the firm will be responsible for sales in Northeast Georgia.

Musgrove establishes two new sales offices

THE CURTIS MUSGROVE Company, manufacturer's representatives, have announced the establishment of new sales offices at Tulsa and San Antonio. O. K. Anderson, who has been in charge of the Waco, Texas office for the past five years will cover the state of Oklahoma, with headquarters at 202 Tri-State Building, Tulsa.

In charge of the new office at 106 Warren St., San Antonio, Texas, will be R. D. Erb, who will have as his territory, Austin, San Antonio, Corpus Christi, and the Valley. Mr. Erb will also spend some time in other territories as he is a specialist on dry and oil switchgear.

Westinghouse offers information service

A NEW PRODUCT information service designed to keep persons interested in lighting posted on the newest developments in that field, has been announced by the Westinghouse lamp division.

The service will consist of frequent mailings of information bulletins which will describe the latest lamp developments and improvements. The bulletins are expected to be of interest to utility personnel, architects, lighting engineers, builders, purchasing agents, municipal engineers, and electrical contractors, distributors and dealers. The service will be available without cost, according to Robert D. Barr, general sales manager of the Westinghouse lamp division.

The information bulletins will be printed in color on 8½" by 11" sheets. They will be universally punched so that they will fit all types of loose leaf binders. When maintained in this manner, the bulletin will serve as a library of lighting products and information.

Lightning arresters described in movie

LINE MATERIAL Industries has filmed a new movie entitled "Let's Look at Lightning!". Highlights include a review of the basic conditions which cause lightning and solutions to various distribution lightning arrester application problems. Important but often overlooked facts and figures on lightning arrester application are illustrated.

"Let's Look at Lightning!" is intended to provide operating and

HOW BELL SYSTEM COMMUNICATIONS SERVE THE POWER INDUSTRY

Harry Otten, system operation manager, and the New York areas served by Con Edison

"We've grown up with private line communications"

— an interview with Harry Otten, Con Edison system operation manager

When did Consolidated Edison first start using private line communications?

Back in 1927. It was our first automatic alarm system on certain of our lines. The board is in our operations center, and certain parts are as useful now as they were 30 years ago.

And, of course, your needs have increased since then

Tremendously! We now generate 3,400,000 Kw to serve 8½ million people in the five-county metropolitan area. Naturally, we've had to add to the communications to let us keep pace.

What do these communications include?

Principally, direct telephone communications between our dispatching centers and generating plants, substations and service headquarters throughout the 600-square-mile area that we serve. In addition, Bell System circuits perform continuously many vital functions, such as automatic control and protection, telemetering of load measurements at remote locations, supervisory control of normally unattended substations, etc.

What's the main advantage of these facilities?

First of all, we couldn't operate without them. We think of private line channels as a production tool. Thus, we obtain the advantages of ready availability of new circuits when and where we need them and the backing of an organization trained to design, construct and maintain communication facilities.

• • •

Private line communications can fit into your operation as profitably. Just call your Bell Telephone Company business office. A representative will be glad to make a study of your requirements.

BELL TELEPHONE SYSTEM

PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER DATA TRANSMISSION SYSTEMS • CHANNELS FOR: REMOTE METERING AND CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV

engineering personnel with a better appreciation of several factors that substantially influence protective levels. Nontechnical personnel should gain a better understanding of a lightning arrester's functional role from the movie. Only 16 minutes are required to show the 16mm sound and color film.

A showing of "Let's Look at Lightning!" can be aranged through the nearest L-M field representative or by writing Line Material Industries, McGraw-Edison Co., Milwaukee 1, Wis.

Marketing personnel named by Virden

A NEW marketing department for the John C. Virden Co., manufacturers of commercial, industrial and residential lighting fixtures, was announced by John C. Virden, Jr., president, at the company's annual sales meeting recently in Cleveland, Ohio.

The new department will be headed by Robert W. Minett, Jr., director of marketing, and will include C. L. Smythe, Alex E. Masterton, newly appointed merchandising and advertising managers respectively, and E. A. Pacius, service and credit manager.

The expansion was made to coordinate the company's sales, merchandising, advertising and promotion activities. All sales activities on standard catalog merchandise, the development and merchandising of new products, advertising and promotion will be under the direction of Mr. Minett, who joined Virden last December. A member of the lighting industry since 1938, he is president of the American Home Lighting Institute.

Mr. Smythe has been a member of the Virden organization for 6 years, serving in various sales capacities. Mr. Masterton has been with the company for 27 years and recently was in charge of the Michigan sales territory. Mr. Pacius has been a member of the company for 22 years.

C. R. "Bud" Hosey was formerly in charge of all sales activities. He was recently elected vice-president in charge of sales development. In his present capacity he is responsible for the sales and expansion of the company's products in special markets.

The newly established marketing department of John C. Virden Company will be headed by (from left) Alex Masterton, advertising manager; Robert W. Minette, Jr., marketing director; and C. L. Smythe, merchandising manager. E. A. Pacius, service manager is not shown.

Southern representatives of the Virden Company who attended the annual sales conference recently in Cleveland, are (from left) William Cason, Knoxville, Tenn.; C. L. Smythe, merchandising manager, Cleveland, Ohio; Jack Raley, Dallas, Texas; and Frank Moos, Tampa, Fla.

Brief news notes of manufacturers

LINE MATERIAL Industries has announced the recent completion of expanded facilities at Permaline Products plants in Barton, Wis., and Sherman, Texas. Nearly one million dollars has been invested in new production machinery, enlarged warehouses, and improved employee facilities at the two plants. New machinery includes equipment for the manufacture of bituminized fibre fittings and the electronically controlled production of fibre conduit in 10-foot lengths.

* * *

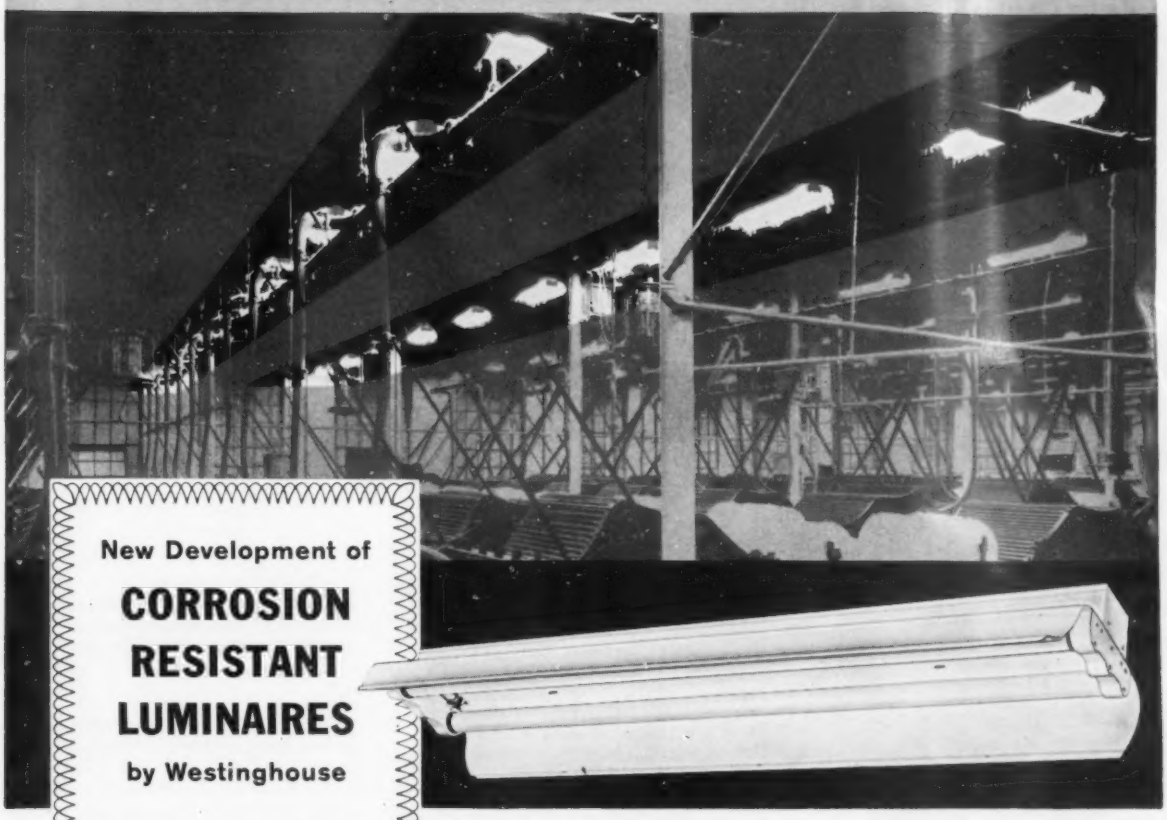
KUHLMAN ELECTRIC CO., manufacturers of transformers and electric furnaces, announce the opening of new general offices located at 2565 East Maple Rd., Birmingham, Mich. The new office building offers greater central control for coordinating the activities of company divisions at Detroit and Bay City, Mich.; Crystal Springs, Miss.; and Salinas, Calif.

* * *

RADIX WIRE CO., manufacturers of plastic and asbestos insulated wire and cable, held an open house recently in celebration of the fifth year in their new plant location at 26260 Lakeland Boulevard in Cleveland, Ohio.

Customers and suppliers of Radix Wire inspected the plant manufacturing facilities, attended a cocktail party and buffet dinner, and watched the Cleveland Indians

Every Plant has some areas where
CORROSIVE ATMOSPHERE CREATES CRITICAL HAZARDS LIKE THESE!



New Development of

CORROSION RESISTANT LUMINAIRES

by Westinghouse

CUTS LUMINAIRE REPLACEMENT COSTS UP TO 75%

Luminaire fabrication with stainless steel—brass and porcelain enamel—proves far more immune to vapors — fumes! Outlasts conventional fixtures 3, 4 and 5 times!

Astonishing numbers of plants today sustain corrosive atmospheres, that are *devastating* to ordinary luminaires! Authorities say there is erosive contamination — excessive corrosive steam — virulent moisture in the air of *virtually every* modern manufacturing operation!

These conditions, they say . . . *"Ravage* materials usually used in making most, common, industrial luminaires . . . resulting in *exorbitant* luminaire replacements costs! — or, the constant threat of short circuits . . . the costliness of corroded substance dripping into product-in-process . . . *even the threat of entire luminaires dropping into machinery—onto workers themselves!"*

In order to help avoid this, Westinghouse has now developed CORROSION-RESISTANT LUMINAIRES — end-plates of nickel-plated brass, stainless steel hardware, porcelain-enameled channels and reflectors, heavy-duty, brass-enclosed lamp-holders—with *all* components as *corrosion-free* as modern metals permit! These materials withstand *severest* corrosive atmospheres. They create luminaires outlasting conventional units 3 to 5 times! And frequently cut replacement costs *up to as much as 75%!*

Your Westinghouse Lighting Specialist is thoroughly prepared to survey *your* plant situation — to recommend *squarely* whether or not *your* operation would benefit from CORROSION-RESISTANT LUMINAIRES. Call him *today*! You *may* benefit *tremendously!*

J-04413

YOU CAN BE SURE... IF IT'S

Westinghouse

and the New York Yankees' game at Cleveland Stadium.

* * *

UNION INSULATING Company, of Parkersburg, West Virginia, has announced the appointment of J. D. Martin Co., 1111 Dragon St., Dallas 7, Texas, as its Texas representative.

* * *

SORGEL ELECTRIC Co., has increased production capacity of their complete line of dry type transformers, saturable reactors and indoor substations over fifty percent with the newly completed addition to their Milwaukee plant. The addition also provides new office facilities and an enlarged engineering department.

Texas representative appointed by Standard

THE STANDARD TRANSFORMER Company, of Warren, Ohio, has announced the appointment of Elgin B. Robertson, Inc., as its representative in the state of Texas. The firm has offices in Dallas and Houston, and will handle Standard's complete line of power, control, and instrument transformers.

Elgin B. Robertson

Mr. Robertson is a past president of AIEE, has been Texas Engineer of the Year, and was one of the organizers and the first president of the Electrical Equipment Representatives' Association.

Dates Ahead

Southeastern Electric Exchange, Personnel Administration Section, John Marshall Hotel, Richmond, Va., July 25-26.

Illuminating Engineering Society, National Technical Conference, Biltmore Hotel, Atlanta, Ga., Sept. 9-13.

Southeastern Electric Exchange, Engineering and Operation Section, Atlanta Biltmore Hotel, Sept. 19-20.

Public Utilities Assn. of the Virginias, 39th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 20-21, 1957.

Industrial Electronics Conference, 6th Annual Symposium, Morrison Hotel, Chicago, Ill., Sept. 24-25, 1957.

Edison Electric Institute, Meter and Service Committee, Hotel Nicolett, Minneapolis, Minn., Sept. 24-26, 1957.

Edison Electric Institute, Electrical Systems and Equipment Committee, Cosmopolitan Hotel, Denver, Col., Sept. 30-Oct. 1, 1957.

National Assn. of Corrosion Engineers, South Central Region Meeting, Oklahoma City, Okla., Oct. 1-4, 1957.

International Assn. of Electrical Leagues, Annual Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 2-5, 1957.

American Institute of Electrical Engineers, Fall General Meeting, Chicago, Ill., Oct. 7-11.

Southern Section, IAEI, Annual Meeting, Dinkler Plaza Hotel, Atlanta, Ga., Oct. 14-16, 1957.

Georgia Chapter, IAEI, Annual Meeting to be held with Southern Section Annual Meeting, Dinkler Plaza Hotel, Atlanta, Ga., Oct. 14-16. Business session 4:30 p.m., Oct. 14.

Southeastern Electric Exchange, Sales Conference, Tutwiler Hotel, Birmingham, Ala., Oct. 16-18.

Florida Assn. of Electrical Contractors, Annual Convention and Trade Show, Soreno Hotel, St. Petersburg, Fla., Oct. 16-19, 1957.

Edison Electric Institute, Transmission and Distribution Committee, Statler Hotel, Boston, Mass., Oct. 17-18, 1957.

Tenth Annual Power Distribution Conference, University of Texas, Austin, Texas, Oct. 28-30, 1957.

Institute of Radio Engineers, Annual Instrumentation Conference and Exhibit, Biltmore Hotel, Atlanta, Ga., Nov. 11-13, 1957.

National Electrical Manufacturers Assn., Annual Meeting, Traymore Hotel, Atlantic City, N. J., Nov. 11-15, 1957.

National Electrical Contractors Assn., Annual Convention, Cincinnati, Ohio, Nov. 13-16.

American Institute of Electrical Engineers, Winter General Meeting, New York City, N. Y., Jan. 20-24, 1957.

THE FUTURE AP&L OFFICE BUILDING—Plans to resume construction of the modern $1½ million office building of Arkansas Power and Light Company in Little Rock were announced recently by R. E. Ritchie, president. The building will serve as headquarters for the Little Rock Division, local personnel and general office executives.

Edwards establishes new district office

ROBERT L. KEMPTON, general sales manager for the Edwards Co., Inc., has announced the expansion of the company's sales and service through the establishment

The new district office of the Edwards Co., Inc. in Atlanta.

of a new district office at 246 Simpson Street, N. W., Atlanta, Ga. This new office will serve Edwards customers in the five-state area of North Carolina, South Carolina, Georgia, Alabama and Eastern Tennessee.

Edwards, one of the nation's oldest electrical manufacturers, is a leading producer of electric signaling equipment for communication and protective devices in homes, schools, hospitals, offices and industry.

The new Atlanta office is under the direction of W. L. Pierce who formerly headed Edwards operations in San Francisco. Ten years ago he joined the Edwards staff in Norwalk, Conn., and later transferred to Chicago and Los Angeles. He will be assisted by Richard Kingston, Atlanta district technical representative formerly of Miami, Fla. Mr. Kingston was previously associated with the Stromberg-Carlson Company as an electrical systems designer and as chief sales engineer. He began his career in U. S. Navy Aviation, where he specialized in radar and communications.

W. L. Pierce **R. Kingston**

Technical books

for the electrical man

Transistor operations

"Transistor Circuits and Applications" edited by John M. Carroll. Published by McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y., 285 pages, illustrated, $7.50.

A new book on transistor structures, techniques, circuits, and equipment—giving a complete picture of the development and present status of the transistor art—has just been published.

Based on articles that appeared in *Electronics* magazine, it offers circuit designers a handy source of detailed information on how to apply transistors in military, industrial, and home-entertainment equipment. It covers typical transistor operating characteristics, important circuit parameters, transistor types, problems of temperature and gain stabilization, and a large number of typical transistor circuits, including newest transistor radios.

Circuits are shown with actual component valves, and include those used in portable and automobile radios, audio amplifiers, military communications equipment, telemeters, servo amplifiers, computers, industrial and medical instruments, and hearing aids. Operating characteristics of over 200 commercially available transistors, representing all types, are listed.

The book covers h and r design parameters, new transistor structures such as silicon units, power transistors, tetrodes and diffused junction units. It shows circuits using silicon and high-frequency transistors. Direct-coupled computer circuits and complementary-symmetry circuits are included.

Electrical evolution

"Early Electrical Machines," by Bern Dibner. Published by Burndy Library, Norwalk, Conn., 58 pages, illustrated, $1.50.

The first two centuries of the evolution of electrical instruments is traced in this recently published book which describes the early experiments and apparatus of the enquiring years from 1600 to 1800.

How frequently the "electricians" of the seventeenth and eighteenth centuries anticipated later discoveries is but a fragment of the richer understanding of the history of science to be acquired from this book.

Discoveries of Francis Hauksbee, William Gilbert, Robert Boyle, von Guericke, Newton, Volta, and many others appear in this richly illustrated history of electricity's formative period.

Radio-TV cross-index

"1957 Master Index to Supreme Publications Television and Radio Service Information," Published by Supreme Publications, 1760 Baslam Rd., Highland Park, Ill., 48 pages, $.25.

This booklet gives a complete cross-index to material in all of seventeen radio manuals and all television volumes from 1948 through 1957. Although each Supreme manual has its own index, this Master Index will save time by giving direct reference to volumes as well as pages where needed material can be found.

Nuclear power

"Nuclear Power Engineering," by Henry C. Schwenk and Robert H. Shannon. Published by McGraw-Hill Book Co., 327 W. 41st St., New York 36, N. Y., 344 pages, 131 illustrations, $6.50.

This newly-published book, planned for engineers, technicians, and executives concerned with practical power development, gives

a clear explanation of nuclear power plants—design, construction, and operation described in one convenient volume.

From essential fundamentals of physics to detailed design features of specific power reactors—every important aspect of the field is covered. In addition to engineering methods, the book includes helpful information on the components of various systems . . . radiation and its effects on equipment and health . . . plant sites . . . economics of nuclear power production . . . and other pertinent topics.

Arrangements of various types of reactors—how they generate heat and how the heat is extracted—how steam works in the plant's power cycle—propagation of fissioning by chain reaction as the basis of nuclear power operation control of fissioning—these and other essentials of nuclear power are covered.

"Nuclear Power Engineering" simplifies the great mass of highly technical material on this subject. By using sequence diagrams to explain complex ideas and procedures, it enables engineers and other workers in utility, manufacturing, and consulting companies to readily grasp the main points of nuclear power production.

Particularly useful is the book's concise description of the power cycle, showing how all elements of a nuclear plant are integrated.

News about people

Frank L. Irvin

R. F. Hollitz

J. W. Ramey

Thomas F. Peterson, president of **Preformed Line Products** has announced the following personnel appointments:

R. F. Hollitz has been named assistant general manager of sales. He will supervise administrative aspects of the sales department and will also coordinate the company's foreign licensing program. He was previously associated with the King-Seeley Corporation and the Ford Motor Company.

F. L. Irvin becomes assistant manager of sales and his duties will concern the administration of company policies with respect to sales representatives, jobbers and distributors. Mr. Irvin is a graduate of Denison University and was most recently sales supervisor for Preformed's Western District.

J. W. Ramey assumes duties as manager of operations at the Palo Alto, California plant. Mr. Ramey is a graduate of Stanford University and the U. S. Naval Academy. He retired from the U. S. Navy with the rank of Rear-Admiral in 1953.

E. H. Brown becomes manager of sales for the Eastern District with over fifteen years experience in various sales and purchasing positions. He is a graduate of Wesleyan University.

R. A. Bell was appointed manager of sales for the Cleveland District, which includes Ohio, Kentucky, Tennessee and West Virginia. He was formerly associated with Reynolds Metals Company and is a graduate of Michigan State University.

P. J. Sullivan, formerly executive vice-president, was elected president of the **Arrow-Hart & Hegeman Electric Co.,** Hartford, Conn., at the annual meeting of the board of directors held recently.

J. R. Cook, former president of Arrow-Hart for twenty-five years was elected chairman of the board. **Rollin N. Peck,** formerly assistant secretary was elected secretary.

Mr. Sullivan was appointed assistant superintendent in 1934 and later advanced to general superintendent. In 1951 he was appointed vice-president in charge of plant operations and production, was elected a director in 1955, and was appointed executive vice-president in 1956.

Mr. Cook was formerly sales manager of the Hart & Hegeman Manufacturing Co., and following its merger with the Arrow Electric Co., he was elected president and director of the Arrow-Hart & Hegeman Electric Company in 1932.

Mr. Peck was first associated with the Hart & Hegeman Manufacturing Company and became advertising manager of Arrow-Hart in 1932 and export manager in 1942. He was appointed assistant secretary in 1951.

W. C. Wallis, vice-president of the **Southern Supply Co.,** Jackson, Tenn., has been appointed chairman of the Electric Heating Committee of the **National Association of Electrical Distributors.**

A member of the Electric Heating Committee since it was organized two years ago, Mr. Wallis has a great amount of experience in this field because of his own company's active interest in the wholesale distribution of electric heating equipment.

One of the major projects of this national committee is to encourage more electrical wholesale distributors throughout the country to actively promote and sell this relatively new commodity in their own areas, and to disseminate information to the industry which will improve the wholesale distribution of electric heating equipment of all types.

The **A. L. Smith Iron Co.,** manufacturers of Smithcraft fluorescent lighting equipment, announces the appointment of **Louis E. Newman** as president. **Julian J. Smith,** now president, will be chairman of its board of directors and treasurer.

Louis E. Newman joins A. L. Smith Iron Company from the General Electric Company where he has served in key positions in engineering, manufacturing, marketing and employee relations.

Mr. Newman is an electrical engineering graduate of Washington University (St. Louis). He has been active in the Council for International Progress in Management, and in 1954 was a member of the U.S.-Italian four-man productivity team that held week-long seminars in each of six North Italian cities under the Marshall Plan. He is the principal author of a book "Modern Turbines," and is the author of over thirty published papers.

James H. Jewell, vice-president in charge of sales for **Westinghouse Electric Corp.,** has been appointed to the new post of vice-president in charge of marketing.

In making the announcement, **John K. Hodnette,** vice-president and gen-

eral manager of the company, said the change has been effected in order to improve and integrate all company functions necessary in the moving of goods from production to customer.

In addition to his current responsibilities for sales, advertising, market research, and sales training and planning, Mr. Jewell will assume the direction of the company's new distribution services department, a system of depots and distribution centers for the handling of company products.

A veteran of 37 years with Westinghouse, Mr. Jewell has directed company sales since 1949. He was born in Chestertown, Md., and graduated from Pratt Institute, Brooklyn, N. Y.

John H. Chiles, Jr., manager of the transformer division of the **Westinghouse Electric Corp.,** Sharon, Pa., has been elected a vice-president of the Westinghouse Electric Corp., chairman and president Gwilym A. Price announced recently.

Mr. Chiles was born in Nashville, Tennessee and was graduated from Virginia Polytechnic Institute with a degree in electrical engineering. He has spent his entire career with Westinghouse at the transformer division, one of the company's largest operations. He became engineer in charge of the instrument transformer section in 1934, division engineer in charge of instrument and regulator activities in 1943, and engineering manager for the entire division in 1949.

Mr. Chiles was appointed manager of the transformer division a year ago. Under his direction, the division is expanding its operations by building a large distribution transformer plant at Athens, Ga.

Appointment of **Russell E. Owen** as advertising and sales promotion manager of **Curtis Lighting, Inc.,** has been announced by **John A. Wright,** president of the 60-year-old Chicago manufacturer of commercial and industrial lighting fixtures.

Mr. Owen is a marketing graduate of the University of Connecticut School of Business Administration and has attended the Wharton School of Business. He was formerly associated with the Miller Company and Soundscriber.

Vincent P. Oatis, Jr., has been appointed distributor sales manager for **National Electric Products Corp.,** according to a recent announcement by **L. D. Shank,** general sales manager of the Pittsburgh firm.

Assuming the duties formerly held by Mr. Shank, Mr. Oatis is charged with implementing sales policy in the field and maintaining the company's distributor policy. Prior to his new appointment, Mr. Oatis was general product manager for the com-

DISTINCTIVE...
EFFECTIVE...
VERSATILE...
Quality Accent Lighting
with amplex
SWIVELITES

When you sell amplex, you'll be selling the finest ...with HIGH PROFIT

Amplex Swivelite C125H "Adapt-A-Unit" construction permits complete interchangeability for 5ll parts for constantly new lighting setups.

Amplex Focalite Easy to focus—most adaptable fixture for lighting displays.

Amplex Spotlites and Floodlites Pure silver reflectors for maximum light output —rated life 2,000 hours.

Write today for catalog and price list.

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Smart Modern ACCENT LIGHTING for:

Department Stores
Retail and Specialty Shops
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Cafes • Schools • Churches
Institutions • Theatres
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amplex offers a Complete Line of Modern Fixtures and Lamps for every Industrial, Commercial and institutional Lighting requirement:

- Swivelites
- Reflector Lamps
- Focalites
- Spotlites
- Hi-Hats
- Floodlites
- Colorbeams
- Infra-Red Lamps
- Incandescent Lamps
- Mercury Vapor Lamps
- Fluorescent Lamps
- Photoflash Lamps

IMMEDIATE DELIVERY

JULES J. DREYFUSS & SONS
P. O. Box 187, Allapattah Station, Miami 42, Fla.
324 Peters St. S.W., Atlanta, Ga.
703 Tchoupitoulas St., New Orleans, La.

TOM HODGES & COMPANY
120 South Cheyenne, Tulsa, Okla.

LEO A. ROACH
5010 New Kent Rd., Richmond 25, Va.

TOM HARRISON COMPANY
P. O. Box 11185, Dallas 23, Texas

J. LOUIS WEYHING
1914 Rutherford Ave., Louisville, Ky

pany. He attended the University of Michigan and joined the company as a midwest salesman in 1941.

After three years of service with the Department of Defense in Washington, D. C., **R. C. Lanphier, Jr.,** has returned to the **Sangamo Electric Company** to assume the newly created position of vice-president and director of sales.

Mr. Lanphier will co-ordinate all of Sangamo's domestic sales, marketing, and promotional activities. He will also direct Sangamo International, Inc., the export selling organization for the parent company and its subsidiaries. His past services with the Canadian and English companies and his wide experience in government activities highly qualify him for this position.

R. C. Lanphier, Jr.

From 1932 to 1939 he served as director in charge of manufacturing, Sangamo Weston Limited, Sangamo's British subsidiary. In 1939, Mr. Lanphier was elected vice-president in charge of manufacturing of the parent company and was made a director in 1943. He later served as general manager of Sangamo Company Limited, Toronto, in addition to his duties as vice-president in charge of manufacturing. For the past three years he has been on leave of absence while he served as Deputy Assistant Secretary of Defense for Supply and Logistics.

Guy C. Rhoad has been named vice-president in charge of manufacturing of the **Gibson Manufacturing Co.,** Atlanta producers of fluorescent lighting fixtures. Mr. Rhoad joined the Gibson organization in 1950 as design engineer and has headed the firm's design department since that time. He designed the Ortho-77 and Ortho-88 commercial and industrial fixtures which "plug in" on a special wireway and afford automatic spacing and alignment, reducing installation time substantially and offering a high degree of versatility and flexibility.

Guy C. Rhoad

Mr. Rhoad's latest fixture design, the Ceilo-35, for low-ceiling application, features a side-mounting arrangement for the ballasts which eliminates the necessity for concealing the ballasts behind panels in the diffusing area.

W. L. Pearson and **Roy Tolk** have been elected vice-presidents by the directors of **Southwestern Public Service Co.,** Amarillo, Texas.

W. L. Pearson

Mr. Pearson started with Southwestern in 1929 while still a student at Texas Technological College. Upon graduation with a degree in electrical engineering, he went on a full-time basis. Industrial manager for the company since 1952, his prior experience includes local managerships at Slaton and Canyon, power sales engineer at Plainview and Lubbock and division utilization manager at Lubbock.

Roy Tolk

Mr. Tolk, an electrical engineering graduate of the University of Texas, has been with Southwestern Public Service since 1938. He has been assistant to the executive vice-president and general manager since 1953, and prior to that time was statistical engineer, engineer and draftsman.

Robert F. Scott, Louisiana division manager of **Southwestern Gas and Electric Co.,** was elected a vice-president at the company's board of directors meeting held recently in Shreveport, La. All other officers were re-elected. They include:

Frank M. Wilkes, chairman of the board; **J. Robert Welsh,** president; **E. F. Graham,** executive vice-president; **S. M. Sharp,** vice-president; **H. W. Pirkey, Jr.,** controller; **J. N. Watts,** secretary-treasurer, and **J. F. Carroll,** assistant secretary-treasurer.

Mr. Scott has been employed by Southwestern since 1937 when he became manager of the Louisiana new business department. He was named assistant division manager in 1946 and later that year was elevated to Louisiana division manager.

H. P. Hoheisel, advertising and publicity manager for the **Oklahoma Gas and Electric Company** has been named "Advertising Man of the Year" by the Oklahoma City Advertising club and received the club's annual distinguished service award. The award was presented to Hoheisel in recognition of his public service in the field of advertising and publicity.

During 1956 Hoheisel served as chairman of the public information committee for the National Cowboy Hall of Fame, now under construction in Oklahoma City, and recently headed public information for a successful $1,500,000 hospital expansion drive. He is president of the Oklahoma Public Relations Association and the Oklahoma Utilities Association.

Herbert J. Scholz, chairman of the board of **Southern Services, Inc.,** the mutual service company of **The Southern Company** system, recently announced his retirement from active service.

Harllee Branch, Jr., president of The Southern Company, said Mr. Scholz would be retained by The Southern Company as an independent consultant on a part-time basis. He will represent company and operating affiliates, Alabama, Georgia, Gulf and Mississippi power companies, in their dealings with Atomic Power De-

velopment Associates, Inc., and Power Reactor Development Company. He will also act as a consultant on the design and construction of the $150,000,000 steam-electric plant being built by the Southern Electric Generating Company, and perform other consulting services.

Walter Frazier, Midwestern Division manager of the **Graybar Electric Co., Inc.,** has announced the appointment of **D. L. Pulliam** as manager at Oklahoma City. The Oklahoma branch covers 49 counties in the state of Oklahoma.

Mr. Pulliam joined Graybar in 1947 in office sales. In 1950 he became a country salesman, and in 1953 became manager of inside construction sales.

The **Edwin F. Guth Company** announces the appointment of **Roger Frank** as the new Guth lighting sales engineer for Alabama, Tennessee, parts of Florida and West Virginia. He will make his headquarters in Birmingham.

For the past 11 years, Mr. Frank has been associated with Mid-South Supply Co., Chattanooga, Tenn., a leading distributor of lighting equipment, during which time he has gained wide knowledge of the lighting field, plus a wealth of practical experience in all phases of the lighting business. Mr. Frank is a graduate of the University of Chattanooga.

Roger Frank

D. Jefferson Faulkner, Jr., has been named sales manager of the Florida District for the **General Electric** Large Lamp Department.

A General Electric lamp salesman in Jacksonville and in Atlanta since 1948, Faulkner will have his headquarters in Tampa. He succeeds **D. B. Clark** who has been appointed Southern Region sales manager with headquarters in Atlanta. The district which he will manage covers all of Florida. Sales offices are located in

IF PLANT VENTILATION IS YOUR 'BABY'

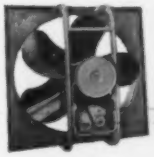
. . . Problems of fume, steam and smoke removal land in your lap. Some areas are too hot for peak work efficiency—fresh air has to be moved into every part of the plant—perhaps humidity control is important or paint booths have to be ventilated . . . You may have any number of different problems, but . . .

Power Line

CAN PROVIDE EVERYTHING . . . FROM SURVEY TO COMPLETE INSTALLATION!

For over 30 years we have been fan specialists. We can effectively assist in the design of a complete plant ventilating system or a spot cooling device. Furthermore, we are not limited in our recommendations because we have over 1000 models and sizes in our line to choose from . . . virtually every type of fan and ventilator that you could possibly use.

Use Power Line's Engineering Experience



TYPE BV

TYPE DRP & BRP

Power Line engineers can provide practical solutions to any ventilating problem . . . We'll gladly make a survey and make our recommendations without cost or obligation—just call or write us!

TYPE DRE & BRE

Power Line FAN COMPANY
PLAINFIELD, NEW JERSEY

Jacksonville, Tampa and Miami. The department with which Faulkner is associated makes and sells a complete line of general lighting lamps for home, industry and commerce.

A graduate of the Alabama Polytechnic Institute in 1947 with a BS degree in Industrial Management.

Tomic Sales & Engineering Co., Detroit manufacturers of Tap-On thinwall connectors, couplings and

Russell M. Smith

other electrical fittings, announces the appointment of **Russell M. Smith** as vice-president in charge of sales.

Mr. Smith, formerly sales manager of the West Coast District for Tomic, brings to his new position a twenty-year diversified background in sales. He will be in charge of marketing, distribution and sales of the entire Tomic line.

The appointment of **Gabe Rice** as sales representative of the **John C. Virden Company** has been announced by **C. R. "Bud" Hosey,** vice-president.

Mr. Rice will represent the Virden Company in Southern Ohio, Kentucky and West Virginia. He formerly was district field engineer for Appleton Electric Co. He resides in Fort Thomas, Kentucky.

L. M. Grawemeyer, vice-president in charge of sales for **The Miller Company,** Illuminating Division, has announced the appointment of **William I. Vawter, Jr.** as sales representative for Georgia and Jackson County in Alabama. He will work out of Atlanta in a combined sales effort with **Charles L. Woodyard,** who has been established in Atlanta for quite some time.

Mr. Vawter joins Miller after ten years' experience with Graybar Electric Company. During World War II he served with the U. S. Army Signal Corps. He attended San Mateo Junior College in California and UCLA.

J. K. Flanagan has been elected vice-president in charge of public relations for **Florida Power Corp.,** it was announced recently by **W. J. Clapp,** president of the utility. Mr. Flanagan, who will head up an expanded public relations program for the company, has served as director of advertising and publicity for the

J. K. Flanagan

past 15 years. A member of the Public Relations Society of America, he is well known throughout public relations and utility circles.

The board of directors of **Anderson Electric Corporation** have elected **C. E. Bitzer** to the newly created position of vice-president in charge of sales. Mr. Bitzer will bring to this

C. E. Bitzer

new position a well rounded background to guide the company's future growth and sales expansion plans.

Mr. Bitzer started with Anderson Electric as Distributor Division sales manager. From that time he has served successively as assistant to the general sales manager, and as general sales manager. He attended both the University of Pittsburgh and Duquesne University.

Better installations in less time

Simple, quick to install

BLACKHAWK 540 BOX SUPPORT

stays rigidly in place

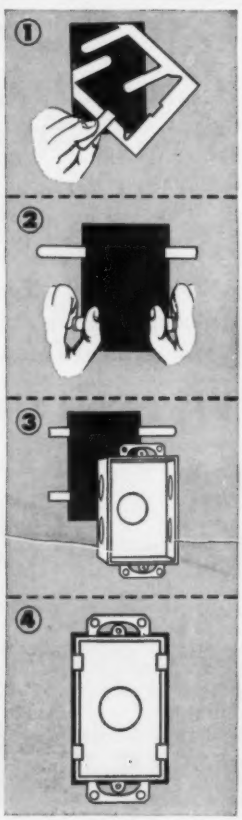
The Blackhawk No. 540 one piece box support slips into the wall opening and tabs are bent back to hold it in place. After the switch box is installed, the tabs are bent to the inside of the box squeezing it firmly in place. It's that simple and quick.

It makes a permanent installation because the Blackhawk 540 box support is a large single piece . . providing rigid, unified support. It does not wiggle or saw because it is parallel to the wall.

For simple, quick, permanent switch box installation, specify Blackhawk No. 540 box support. Ask your electrical distributor for Blackhawk.

Blackhawk Industries

BLACKHAWK INDUSTRIES
DUBUQUE, IOWA



RACO

You Can Always Rely On RACO

ADJUSTABLE BARS

✓ **QUICKLY POSITIONED**

✓ **EASILY INSTALLED**

✓ **SAVES TIME**

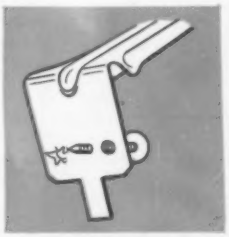
NEW STOP-LOCK

Prevents bar from slipping apart accidentally. Permits separation of bar if desired.

SELF-GAUGING

SHALLOW OFFSET

Place gauging lug against edge of rafter or joist and nail in place.



DEEP OFFSET

Straighten gauging lug and line up flush with edge of rafter or joist.

SERRATED NAILS ARE PRE-ASSEMBLED TO THE BAR

Ready for immediate installation.
No hunting for nails.

✓ **EXTRA STRONG**

THE ONLY BAR ON THE MARKET WITH RIGID "M"* CONSTRUCTION

RACO Adjustable Bars have been vastly improved. Note these extra advantages . . . pre-assembled serrated nails for easy installing . . . self-gauging lugs for fast positioning . . . friction stop-lock that prevents bars from accidentally slipping apart. High quality electro-galvanized finish. Write today for new bulletin describing these superior Raco Adjustable Bars.

ONLY 4 BARS DO THE WORK OF 16

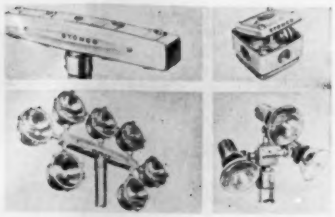
Simplifies stock control . . . requires less investment in inventory. Two sizes fit most every job.

RACO **ALL-STEEL EQUIPMENT INC.** Aurora, Illinois

New products

Troughs and splice boxes for floodlight wiring

TWO NEW SERIES of weatherproof wiring troughs and splice boxes just announced by Stonco Electric Products Co., 333 Monroe Ave., Kenilworth, N. J., are designed to increase



floodlighting efficiency in outdoor applications as well as to cut down costs in initial equipment, installation and maintenance.

Covers expose the entire box or trough interior for quick, easy splicing. Trough holes fit any standard lampholder or fitting, and are slanted outward to provide additional free space for more lampholders on each trough so floodlighting installations can be laid out with fewer clusters.

The new wiring troughs come in sizes from 9" to 22" in length, to hold up to 12 lampholders individually, while the new splice boxes come in square, round, and hexagon shapes, all available with locking set screws at each hole to permanently fix floodlighting focus once set. Interchangeable accessories include pole top slip fitters for ½", 1½", 2", 2½", and 3" pipe, and wall brackets for mounting complete floodlighting assembly units.

Unlimited clusters can be "tailor-made" with the many standard interchangeable spotlight and floodlight lampholders available. Trough clusters can be arranged to provide a wide-angle sweep of light or an extra long, high intensity pencil beam, as needed. Splice boxes with the smaller 75 to 300 watt lampholders can be assembled to provide the exact illumination needed without excess equipment or wasted light spillage.

For additional data, ask for item P-714, using the coupon on page 117.

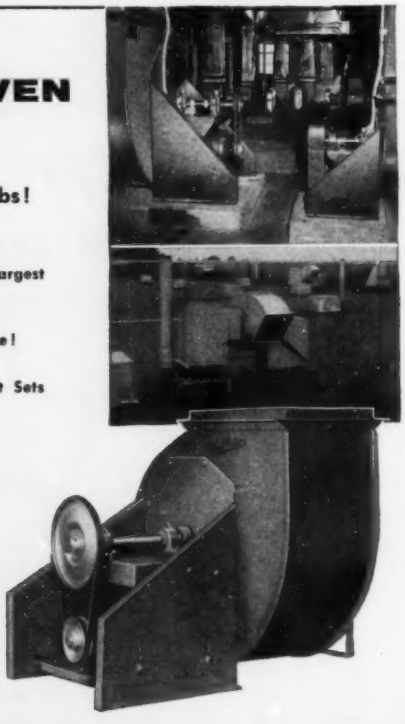
PRACTICAL • PROVEN • POPULAR

for "1001" commercial ventilation jobs!
"BUFFALO" BELTED VENT SETS

- **The same high performance built into the largest "Buffalo" Fans!**
- **Capacities up to 20,000 cfm!**
- **Non-overloading, regardless of system pressure!**
- **Easy "package" installation!**
- **Also, a line of efficient direct-drive Baby Vent Sets for your smaller capacity jobs!**

Top: Real flexibility possible with multiple unit installations.

Center: Outdoor or roof installation, with all-weather drive cover.



WRITE FOR BULLETIN 3720

BUFFALO FORGE COMPANY

210 Mortimer St., Buffalo, N. Y.

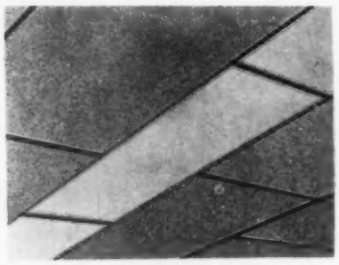
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

Sales Representatives in all Principal Cities

INDUSTRIAL EXHAUSTERS BELTED VENT SETS PROPELLER FANS "E" BLOWER-EXHAUSTERS

Lay-in troffer for inverted tee systems

SMITHCRAFT LIGHTING, Chelsea 50, Mass., has announced the development of the lay-in Gridex troffer, a one-foot wide fluorescent unit specially designed to provide flexible re-



cessed lighting for inverted one-foot "T" grid-type suspended ceilings having interlocked tees.

Smithcraft's Gridex troffer integrates architecturally with any interior design and is available with hinged steel louvers or with shielding in hinged door frame. It is extremely versatile and allows a wide freedom of design in the creation of light patterns.

With steel louvers, the unit provides a shielding of 40 degrees by 40 degrees. The louvers are hinged on Smithcraft's patented Duo-Cam hangers and may be easily opened or closed from either side.

The troffer is also available with all types of glass and plastic shielding in the hinged door frame, which features Smithcraft's exclusive pressure-catch. This enables the door frame to be opened or closed by simply pressing upwards. The doorframe is slimly designed for better appearance and efficiency.

Gridex troffer units are available in 4-foot lengths for 2 and 3 rapid-start Bi-Pin Lamps. The Gridex is extremely easy to install, individually or in continuous rows. Units are tilted, inserted in the opening and placed in position on the ceiling supporting members. There are no visible hinges, catches, bolts or screws.

For additional data, ask for item P-715, using the coupon on page 117.

Fixture uses own weight for self alignment

A PATENT is pending on a new fixture aligner, identified as Type VPFH by its manufacturer, the Killark Electric Mfg. Co., Vandeventer and Easton Sts., St. Louis, Mo. It has been especially designed for use with Killark's Type VG Series junction boxes.

Through the use of a neoprene cushion, the fixture aligns itself as a result of its own weight. The neoprene feature also helps absorb vibration and shock. The fixture can swing 25° in all directions.

The aligner is extremely simple to assemble, requiring only a screw-

driver. The threaded fixture stem hub is molded into the neoprene insert and provided with a flange larger than the opening in aligner casting—making for reserve safety. The fixture stem cannot twist and damage wires.

For additional data, ask for item P-716, using the coupon on page 117.

Shallow weather-tight recessed downlight

AN EXTRA shallow-depth recessed downlight, which will accommodate up to 150 watt lamp is being manufactured by McPhilben Manufacturing Co., Inc., 1329 Willoughby Ave., Brooklyn 37, New York.

The fixture was designed for installation in either poured concrete or plaster ceilings and is constructed of rugged, maintenance free, heavy

cast aluminum with satin anodized finish. Its weather-tight construction includes 16 gauge galvanized back box, neoprene gasketing and heavy opal tapered glass. The downlight (catalog listing #4324) is ideal for shower rooms, canopies, and corridors in public buildings.

For additional data, ask for item P-717, using the coupon on page 117.

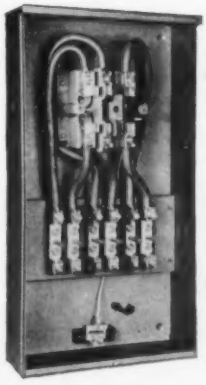
Shallow troffer packaged with yokes for leveling

THE WAKEFIELD CO., 731 S. Water St., Vermilion, Ohio, announces their new shallow one-piece troffer available in four sizes with a wide range of diffusers including lenses, louvers and patterned vinyl, all on module.

ANCHOR

SAFETY SOCKET METER CABINETS

Combination devices with compartments for test switches or test blocks below the socket, which offer simple means of disconnecting, by-passing and field testing of meters. Test device space can also be used as a pull box for underground services.



Cat. No. 2007-WM
both covers removed, 7 terminal 200 amp. socket wired with 4/0 to 6 pole 200 amp. test block.

For 100 ampere and 200 ampere services and for 4, 5, 6, 7, 8, 13, 14, & 15 terminal meters.

•

With or without test devices and wired or unwired.

•

Steel or Aluminum.

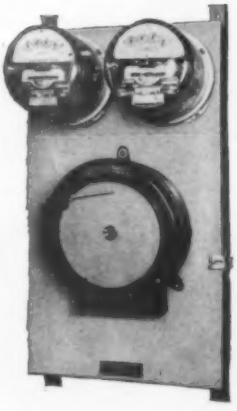
•

Indoor or Outdoor.

•

Flush or Surface.

•



Cat. No. M-213
with two 13 terminal meters with contact operated demand meter mounted on hinged door.

Separate sealable and removable covers over test block chambers. May be hinged for indoor use.

•

Test switch shelves, if required, are drilled to accommodate a variety of test switches and blocks.

Send for Complete Information

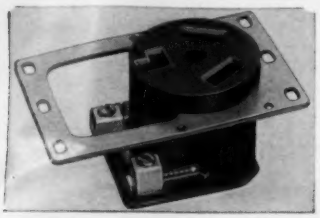
ANCHOR MANUFACTURING CO.
MANCHESTER, NEW HAMPSHIRE

1' x 4', 1' x 8', 2' x 4', 2' x 2'. The rapid start slimline unit is of simplified, functional design with 85% reflecting surfaces, and comes flanged, snap-in or lay-in. The troffers are packaged with 2 hanger bolts on yokes for leveling.

For additional data, ask for item P-718, using the coupon on page 117.

Flush type power outlets for 250 volt installations

A NEW LINE of three-wire power outelts for electric ranges, dryers and industrial use has just been intro-



duced by Bell Electric Co., 1844 W. 21st St., Chicago, Ill. These flush type outlets are made to fit both 30 and 50 ampere, 250 volt installations.

Complete with heavy-duty contacts and terminals for convenient mounting, the flush type bakelite power outlets feature slide bar heavy-duty, movable terminals for easy wiring. Wire is cut to desired length, bared wire is laid on slide bar; movable terminal is pushed over wire and screw is tightened for positive contact.

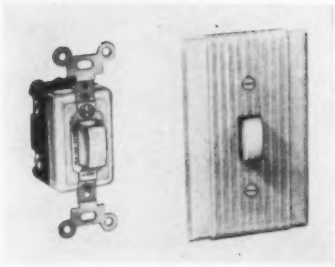
A one piece extra wide yoke with elongated mounting holes provides perfect fit on 1 and 2 gang plaster covers. A complete line of 1 and 2-gang wall plates are available for use with the range and dryer outlets. These plates can be obtained in the following finishes: chrome, satin brass, cadmium plated, brass plated, stainless steel, etc.

For additional data, ask for item P-719, using the coupon on page 117.

Silent, tap-action switch for all standard plates

A NEW TOUCH in luxury lighting control has been introduced by the Arrow-Hart & Hegeman Co., 103 Hawthorne St., Hartford 6, Conn.

The Quiette Tap Action Switch eliminates the need for toggle-flipping and knob-twisting, and provides safe, dependable and quiet mechanical operation of incandescent and fluorescent lights and appliances. Designed to fit any standard toggle wall plate, the switch eliminates the need for special, costly wall plates.



With conventional binding screws or screwless terminals, it is available for all standard connections in brown and ivory. This new Quiette Switch is rated 15 or 20 amperes, operates on full voltage, non-relay.

For additional data, ask for item P-720, using the coupon on page 117.

Dust-tight lighting fixture for grain storage elevators

A PORTABLE, dust-tight lighting fixture for illuminating the interiors of grain storage silos has just been introduced by Crouse-Hinds Co., Wolfe and 7th North Streets, Syracuse, New York. Approved by Underwriters' Laboratories for use at Class II, Group

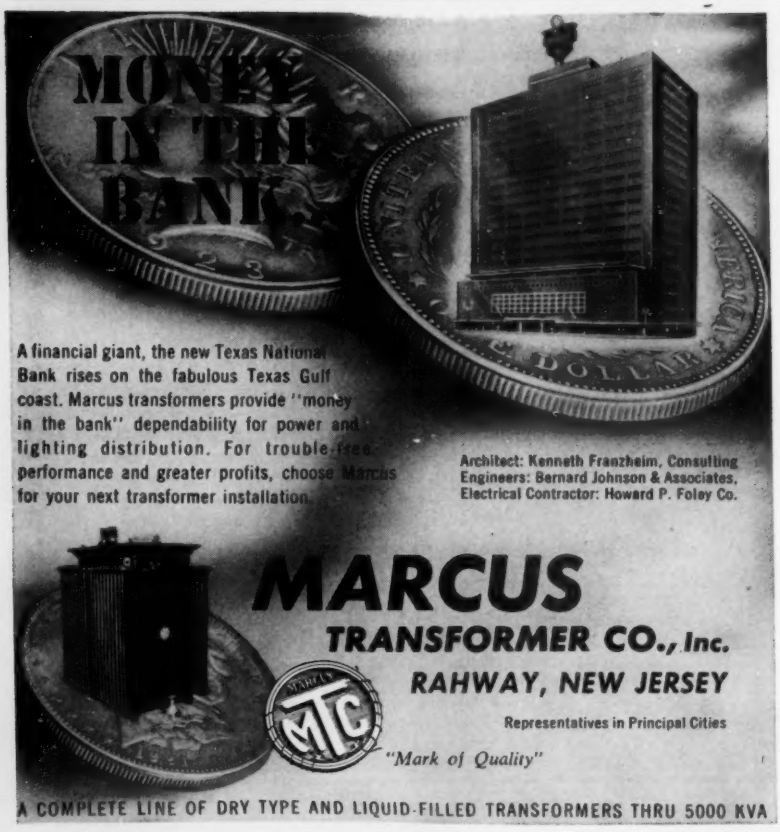
G, hazardous areas (flour, starch, or grain dust), the new weatherproof and corrosion-resistant cast aluminum fixture is a type ADDR-12 floodlight mounted on a triangular, caster-equipped steel dolly. The dolly easily will span a 33-inch diameter bin manhole.

Equipped with a hinged door held in place by three C-clamps, the floodlight contains a medium screw base receptacle, polished Alzak reflector, heat-resistant lens, and accommodates a 250-watt "G" bulb lamp, with the lamp receptacle located in the bottom of the housing.

For additional data, ask for item P-721, using the coupon on page 117.

Quiet mechanical switches operate in any position

QUIET, almost silent operation without mercury or other fluids, lifetime performance, an "L" rating and an attractive price are some of the many features of the new "No-Klik" mechanical quiet switches manufactured by Circle F Mfg. Co., Trenton 4, N. J.


MONEY IN THE BANK
A financial giant, the new Texas National Bank rises on the fabulous Texas Gulf coast. Marcus transformers provide "money in the bank" dependability for power and lighting distribution. For trouble-free performance and greater profits, choose Marcus for your next transformer installation.
Architect: Kenneth Franzheim, Consulting Engineers: Bernard Johnson & Associates, Electrical Contractor: Howard P. Foley Co.
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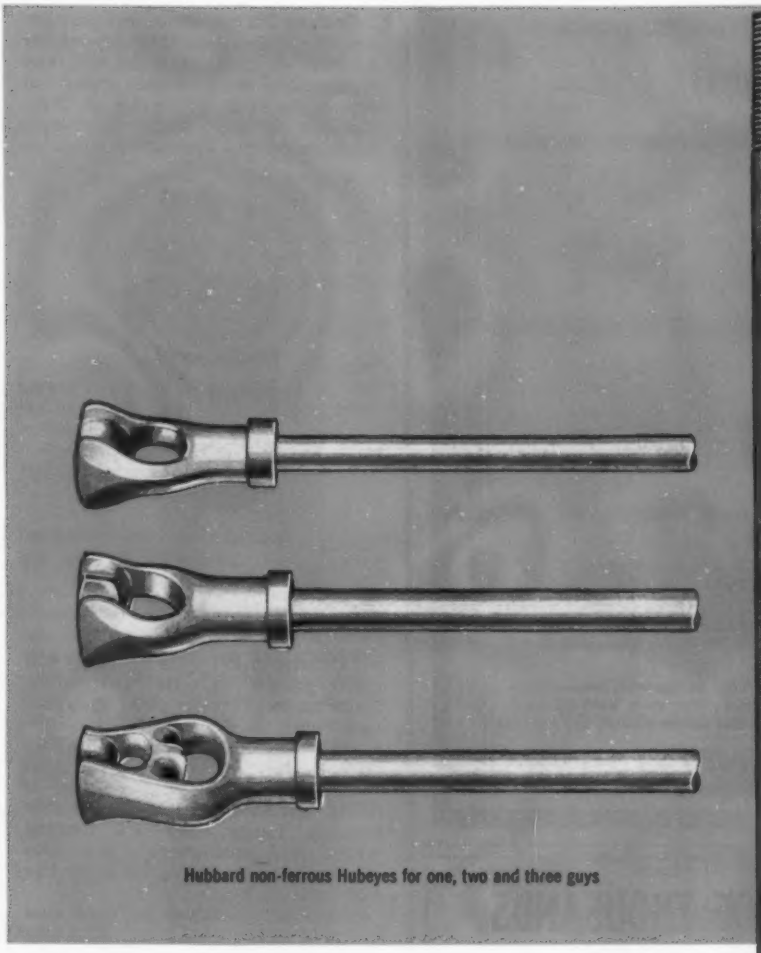
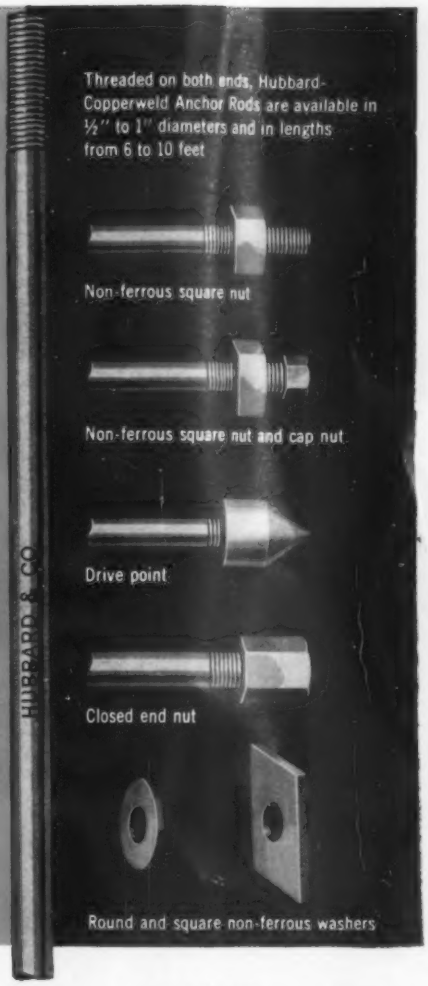
TRANSFORMER CO., Inc.
RAHWAY, NEW JERSEY
Representatives in Principal Cities
MTC
"Mark of Quality"
A COMPLETE LINE OF DRY TYPE AND LIQUID-FILLED TRANSFORMERS THRU 5000 KVA



Hubbard non-ferrous Hubeyes for one, two and three guys


Threaded on both ends, Hubbard-Copperweld Anchor Rods are available in ½" to 1" diameters and in lengths from 6 to 10 feet
Non-ferrous square nut
Non-ferrous square nut and cap nut
Drive point
Closed end nut
Round and square non-ferrous washers
Hubbard & Co.

Hubbard-Copperweld Anchor Rods last like copper... hold like steel

Corrosive soils and surface water, perpetual enemies of anchor rods, more than meet their match when they attack Hubbard-Copperweld Anchor Rods. The molten-welded copper exterior of the rod provides the permanence of copper to prevent rust and corrosion. The steel core assures a strong, dependable anchor for overhead lines.

Hubbard-Copperweld anchor rods and accessories are carried in stock and sold exclusively by leading electrical distributors everywhere. A phone call to your nearby Hubbard Distributors' storeroom will bring immediate deliveries to your warehouse.

When you specify Copperweld you get quality. When you specify Hubbard you will get extra quick service. You are sure of an ample stock of the right sizes and combinations for your job. Deliveries are fast . . . more than two hundred electrical distributors handle Hubbard Hardware. There's one near you.

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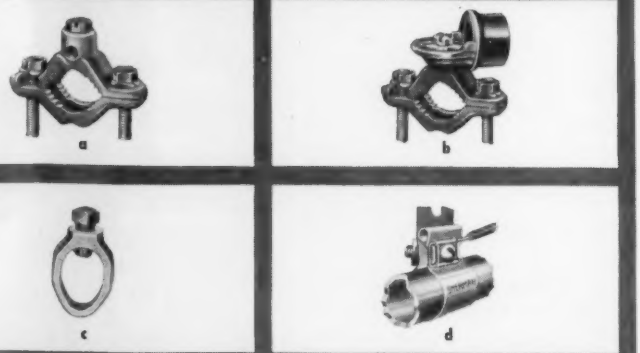
LIVE BETTER ELECTRICALLY

to be well grounded—



rely on **Sherman**

a. GF-138 Solderless Ground Fittings—Rugged bronze for strong, permanent grounding. For ½-1", 1¼-1½", 1½-2" pipe.

b. GF-23 Conduit Solderless. Adjustable swivel hub. Strong bronze alloy. For ½" to 1" dia. pipe.

c. Cast Clamps meet REA and utility standards. Low-resistance copper alloy. Wedged connection won't loosen.

d. SL Type. UL approved. Tempered pure copper. Wire up to AWG #8 solid. Positive and permanent.

H. B. SHERMAN MANUFACTURING CO.
Battle Creek, Michigan

THE LIFE-LINE OF THOUSANDS OF INSTALLATIONS

from Coast to Coast!

AMERICAN Bonded ARMORED CABLE

In every conceivable type of installation in almost every conceivable type of condition, American Bonded provides yeoman service . . . meets every cabling requirement. Installations across the nation are proof positive that American Bonded on the job is a guarantee of ruggedness, flexibility and durability. Remember to specify, order and install AMERICAN BONDED.

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PEABODY BROTHERS
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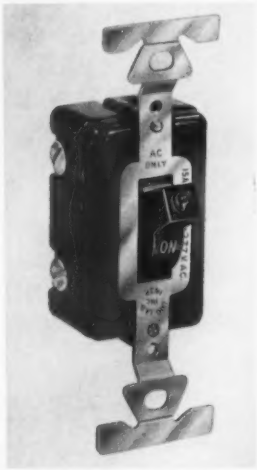
Dallas Warehouse
PEABODY BROTHERS
3015 Taylor St.
Dallas, Texas

Designed to operate in any position, the "No-Klik" line is approved for control of both incandescent and fluorescent lamp loads. Rated at either 15A - 120 - 277 V a-c or 20A - 120 - 277 V a-c, these dependable switches control fluorescent lamps on



a-c circuits of 277 volts or less at full rated switch capacity and motor loads up to 277 volts at 80% of current rating of the switch.

The switching mechanism, having durable phosphor bronze spring arms with large silver alloy contacts, is totally enclosed in a sturdy bakelite housing. Large head #8 binding screws will accommodate any wire size up to #10. Mounting strap has wide plaster ears.

"No-Klik" switches are available in single pole, double pole, and 3-way models with either brown or ivory toggle handle. Red molded covers identify 20 amp. switches.

For additional data, ask for item P-722, using the coupon on page 117.

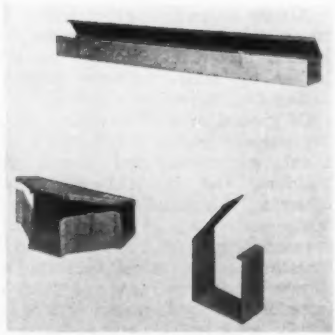
Wireways and fittings eliminate wire pulling

WIRE can be assembled and laid in after the wireway is installed, when use is made of Boss lay-in electrical wireway and fittings, just introduced by The Huenefeld Co., 2702 Spring Grove Ave., Cincinnati, Ohio.

The complete line of flangeless hinged-cover equipment eliminates wire pulling and the risk of damaging insulation.

Three sizes of lay-in wireway are available in the new line: 2½" x 2½", 4" x 4", and 6" x 6". Lengths of 1, 2 and 5 feet are included. The flangeless units are equipped with firm, but easy knockouts and full length hinged covers. Sections are designed so that they can be easily clamped together by a U-connector, or can be attached to flanged wireway by using an adapter.

The Boss line offers a complete selection of accessory fittings. U-connectors, 45 and 90 degree elbows, T



fitting pull boxes, closing plates and others are available. All are of the lay-in type, which eliminates wire pulling.

For additional data, ask for item P-723, using the coupon on page 117.

Enclosed molded case air circuit breakers

OF HIGH interrupting capacity, enclosed molded case air circuit breakers in NEMA IV, VII and IX enclosures are available in the Cordon-type (ITE Circuit Breaker Co.) from Hope Electrical Products Co., Inc., 28 Long Avenue, Hillside, N. J.

Providing fault protection up to 100,000 rms amperes, the units combine the design and operating features of molded case circuit breakers

with current limiting Chase Shawmut Amp-Traps in one compact unit. Low magnitude fault conditions are cleared through breaker without affecting Amp-Traps. At higher magnitude, the Amp-Traps assume fault clearing in less than ½ cycle and limit short circuit current to a fraction of peak available value.

For additional data, ask for item P-724, using the coupon on page 117.

New lighting louvers for all applications

TWO SIZES of lighting louvers, ideal for all types of lighting applications are available now from Sinko Manufacturing and Tool Company, 75 Wacker Dr., Chicago 1, Ill.

Molded of high impact translucent, color stable polystyrene, ½ x ½ x ½ cells to provide a shielding of 45° x 45°. Available in a 16 x 24 inch size and a one piece 10¾" x 47¾" size.

For additional data, ask for item P-725, using the coupon on page 117.

Your key to economy and dependability

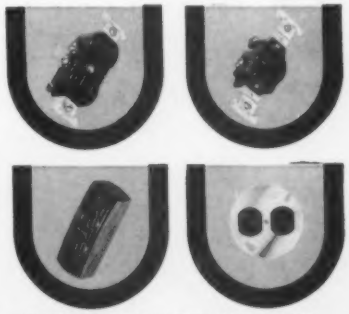
LEVITON U-GROUND DEVICES

Yes, Leviton is your key to cost-*economy* because Leviton has the know-how of mass producing Wiring Devices — gained over almost half a century of manufacturing experience. Leviton knows how to keep quality at the top, and prices at the bottom.

There's no need to sacrifice quality for the sake of economy, either. Leviton has *absolute quality control* — from selected raw materials to completed product. That's your key to *dependability.*

Now available: a new combination switch and U-ground outlet; a complete line of 3-wire U-ground caps and connectors; single and duplex receptacles, receptacles on covers — all in either tandem or parallel types. Duplex receptacles are also available with grounding terminals for individual outlets.

Follow the leaders! **Specify LEVITON U-GROUND WIRING DEVICES.**



rated 15A — 125V rated 15A — 250V

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For building wire and cable contact our subsidiary: AMERICAN INSULATED WIRE CORPORATION

Free bulletins

Autotransformers are described in a four-page bulletin (GEC-1433) issued by **General Electric Co.,** Schenectady 5, N. Y. Included are application pointers; prices, new dimensions and model numbers; and selection data as well as connection diagrams on dry-type specialty transformers, single- and three-phase, 50 and 60 cycles, which are used for boosting or bucking voltage on single and three-phase circuits in either indoor or outdoor service.

For additional data, ask for item B-726, using the coupon on page 117.

Bulletin number 56078, entitled "Outdoor Lighting—Industrial and Commercial Applications," is now available from **Line Material Industries,** McGraw Edison Co., Milwaukee 1, Wis. The bulletin explains the application of fluorescent, incandescent, and mercury vapor equipments for **lighting outdoor commercial facilities** or areas. Information about accessories, such as ballasts, brackets, and standards is included.

Photographs and plan drawings are shown for typical applications, such as motel, shopping center, service station, loading dock, crane, and storage area lighting. Specific types of luminaires are recommended for the various purposes. Suggested minimum lighting levels and typical light distribution patterns are included.

For additional data, ask for item B-727, using the coupon on page 117.

A descriptive four-page brochure on **power and welding cable** is available from the Paranite Wire and Cable Division **Essex Wire Corp.,** Ft. Wayne, Indiana. Construction information on the conductors, insulation, jacket and separator used on these cables is briefly described.

Charted data showing sizes available, number of conductors, stranding, amperes rating, insulation and sheath thickness, outside diameter and approximate shipping weight is included for the types of power and welding cable available.

Also shown visually are the outstanding characteristics of these cables—namely: flexibility, abrasion resistance, impact strength, protective cover and exceptional high electrical strength.

For additional data, ask for item B-728, using the coupon on page 117.

A new 24-page booklet which discusses the **theory and operation of instrument transformers** has been released by **Allis-Chalmers Manufacturing Co.,** Milwaukee 1, Wis.

Of special interest to utility metering superintendents, industrial electrical engineers and switchboard builders, the bulletin deals with metering applications and gives many examples of connections. It presents many ASA standards in interesting easy reference form and shows typical current and potential transformer performance curves. A handy ratio-phase angle correction chart is also included.

For additional data, ask for item B-729, using the coupon on page 117.

A new 14-page catalog on their specialty **motors, fans and blowers** has just been released by **Ashland Electric Products, Inc.,** of 32-02 Queens Blvd., Long Island City 1, N. Y., suppliers of synchronous motors to the recorder, electronics and instrumentation industries.

This informative catalog offers full details, physical specifications and electrical characteristics on Ashland's complete line of synchronous, torque, induction and gear motors, centrifugal blowers and axial fans. Both standard and custom models are available to order for commercial or military applications.

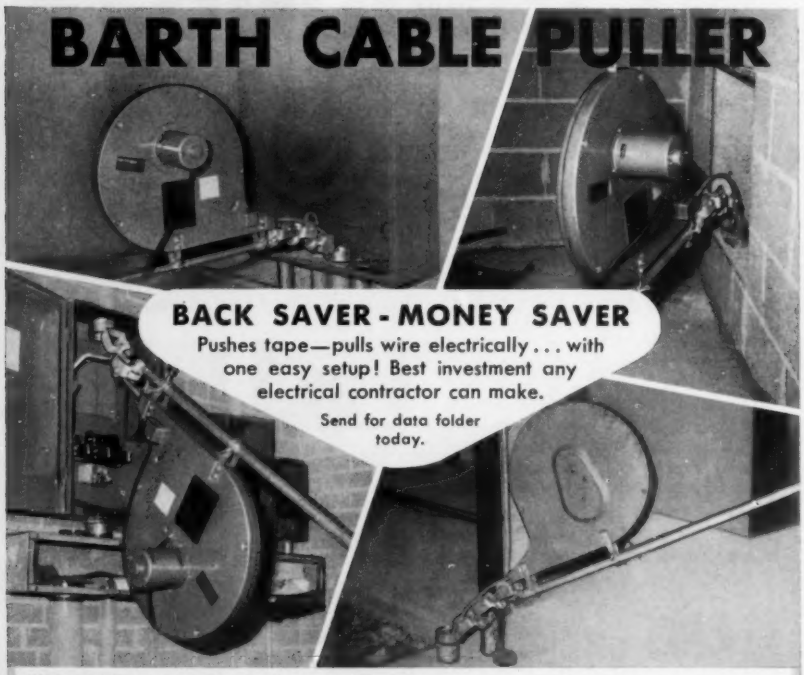
For additional data, ask for item B-730, using the coupon on page 117.

A new 50-page booklet entitled "Timely Tips on Transformer Maintenance" is available from **Westinghouse Electric Corp.,** P. O. Box 2099, Pittsburgh 30, Pa. The booklet discusses **transformers and their maintenance** and includes such subjects as general inspection procedures, classification of transformers, methods of drying out, and transformer connections. It is written for maintenance people in electric utilities, industrial plants, and commercial buildings.

For additional data, ask for item B-731, using the coupon on page 117.

Three new **mobile type d-c Hypots** for testing to 75,000 volts are described in Bulletin 5-1.1, available from **Associated Research Inc.,** 3758 Belmont Ave., Chicago 18, Ill. The Hypots are designed for testing of high-voltage cables, insulation materials, large rotating machinery and related high-voltage equipment.

For additional data, ask for item B-732, using the coupon on page 117.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BACK SAVER - MONEY SAVER
Pushes tape—pulls wire electrically . . . with one easy setup! Best investment any electrical contractor can make.
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Please send complete Cable Puller Data Folder and prices.

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CITY..... ZONE..... STATE.....

Ad objectives

(Continued from page 44)

aspects of advertising, Mr. Ogden answered the first question, "Why advertise?" with: "Advertising

Pennsylvania's Turnpike... Model for Modern Motoring

WIRE BY PHELPS DODGE

When the Pennsylvania Turnpike opened in 1940, it was the first modern highway of its kind in the East. Since then, it has earned a reputation as a model super-highway whose design combines a free flow of traffic with a low accident rate.

One of the requirements for the Turnpike tunnels, interchanges, approaches and portal buildings was an electrical system of the highest quality. That's why Phelps Dodge building wire and rubber insulated, neoprene-jacketed cable was installed. For 17 years, this wire and cable has been giving the Turnpike dependable, trouble-free service.

On every wiring job where top-quality performance, expert workmanship and experienced "know-how" are called for, *it pays to rely on Phelps Dodge and your Phelps Dodge distributor!*

PHELPS DODGE COPPER PRODUCTS CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Boston, Buffalo, Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Fort Wayne, Greensboro, N. C., Houston, Jacksonville, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

speeds up the process of getting things."

On the second topic, "When to advertise," he emphasized: "Consistency and repeated advertising is what counts."

The third aspect of "How to advertise" brought forth this remark: "Make it easy to see, easy to read; make it easy to want; and make it pleasant."

Also, he said: "Reach the most prospects for the least costs. Estimate properly how much money to invest to meet the change in conditions and times. Estimate your potential gross profit a year in advance, have a good bank account, develop a plan to follow, and figure closely your percentage to invest in the advertising program."

Preformed rods

(Continued from page 53)

not been installed as yet. Therefore, we have no experience with them. However, the laboratory investigations as furnished by the manufacturer look very good, and their future use by this company is predicted.

A few of these individual rods have been used successfully for lashing aerial cable to the supporting strand on short span construction.

Preformed tension splices

We have witnessed tests of full tension splices for ACSR. The mechanical tests appear satisfactory. We feel that the conductivity tests may not be conclusive, as there may be an increase in resistance with weathering under certain conditions. Also, the scope of the tests do not cover the full range of operating conditions. Results from the laboratory so far are very promising, and we are extremely interested in the continued research on this item which we hope will provide us with sufficient evidence to justify our using it. The joint making procedure would be greatly simplified by use of a preformed full tension splice.

There are several accessories on which we have had no experience nor seen or made tests, such as plastic guards to prevent abrasion, hot splice shunts, and spacers for bundled conductors. There are, no doubt, places in the industry where these devices may be used to advantage.

To date, our experience with these products has been satisfactory in every respect. The present life experience is only a fraction of the expected life. We invite other utilities to exchange information and experiences relative to these new products.

(This article has been adapted from a paper presented before a recent meeting of the Engineering and Operation Section, Southeastern Electric Exchange.)

Transformer loading

(Continued from page 66)

much transformer capacity being installed? Figure 4 shows a point-to-point plot which is indicative of the installed transformer capacity relative to system demand. Since the transformer additions are based on calculated load for the previous year, the curve is transformer capacity divided by the demand for the previous year. The actual magnitude of the ratio has no practical significance, but the trend is important. The trend is down. The lowest ratio occurred in 1956, which means that in the year of the best outage record, proportionally fewer transformers were installed. It appears that the transformers must have been put in the right places.

Cost of field survey

The cost of the initial field survey and the preparation of the card file was about 8 to 10 cents per customer. About 12 cents per customer is spent annually in maintenance of the file, use of machine accounting equipment, and preparation of jobs for transformer changeouts. The annual cost also includes a continuous field survey, scheduled to recheck the entire system every six years. This is an estimate of the total cost and does not allocate a share to the continuous use, throughout the year, of load survey information in working new service applications.

It is realized that the trends experienced are based on relatively short term usage. Perhaps it is premature to conclude that this is best method available. We are convinced, however, that the billing computer and tabulating machines are extremely valuable engineering tools that make this transformer loading practice, with its

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FLOOR BOXES • WIRING SPECIALTIES

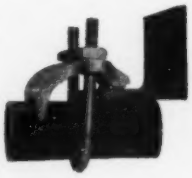
Clean and compactly designed to cut installation time to the bone and give smooth trouble-free service, "Latrobe" Products give a full measure of value.

Adjustable Watertight Floor Boxes

All adjustable boxes are now equipped with a positive bond which makes them completely fire-proof.

"Latrobe" Pipe or Conduit Clamp

This clamp is made with a double safety bite of case hardened tool steel. Two models—Right Angle and the Parallel support. Each model comes in 10 sizes to handle pipe or conduit ½" thru 4".



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volume of computations, not only feasible but economical. It is certainly reasonable to expect that, with added experience, we can improve on results that are now highly satisfactory.

(This article has been adapted from an address presented before the recent American Power Conference held in Chicago, Ill.)

Lighting course

(Continued from page 25)

attending one or more meetings.

Varied representation

As an idea about the importance given the course, the following statistics on enrollment representation prove enlightening:

Engineers & architects, 4
Lighting equipment manufacturers, 9
Electrical wholesalers, 5
Electrical contractors, 23
Power companies, 2
Lamp manufacturers, 2
Cities, 15

Five members of the Florida Power Corp. Lighting Department in St. Petersburg and Clearwater attended all meetings. Based on the success of the course, Florida Power has scheduled a similar program in each of its division headquarters.

This type of undertaking requires a great deal of time on the part of those who conduct it. However, a response such as was awarded this venture justifies all effort exerted, company officials agree.

Flexible fluorescents

(Continued from page 19)

absorbing glass, the design further reduces air conditioning load by use of continuous canopies over windows, which project 4′ 8″ from the building. They create the illusion of enlarging size of interior ceilings, and, in addition, serve as walkways for window-washers.

Both heating and cooling systems are part of one central system, subject to area control within the building, carried through ducts to ceiling diffusers. These ceiling diffusers are shifted among the movable ceiling panels.

A second system is ranged around the perimeter of each floor, designed so that each room's occupants may maintain control of

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AND SAVE!

... ON UNION'S CONVENIENT # 3 BRACKET BOX OR BAR HANGER COMBINATION.

UNION'S
NEW 3090
.....A 3½" BOX WITH 4" WIRING CAPACITY
ELIMINATES
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Write for literature and free samples.

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temperature and air movement within that room, through miniature air-handling units.

Two 50-horsepower automatic gas-fired boilers and a 300-ton Trane compressor are the central units in the flexible heating-cooling system, housed in the ground-floor boiler room.

Relay conference

(Continued from page 70)

operating conditions, and main highway routes. When the study is completed, the diagram is marked with suitable symbols to indicate the locations of automatic sectionalizing devices. . . .

Mr. Burch then described the line impedance diagrams made with the help of a templet containing scales for positive sequence impedances of the various sizes of wire used, as well as a set of scales representing "adder" impedances for the various sizes of neutral conductor which are added to the positive sequence impedances in order to ultimately obtain the phase-to-neutral fault currents.

Line impedances are calculated in ohms, using a graph sheet approximately 22 x 30 inches with resistance ohms along the horizontal axis and reactance ohms along the vertical axis, both to a scale of ½" per ohm. Circular rulings to the same scale serve to convert the R and X values to scalar impedance values at any point on the sheet.

These resultant impedances actually are one-third of the summation impedance (positive plus negative plus zero sequence) of the particular combination of primary and neutral conductors. The phase-to-neutral impedances are plotted in this manner rather than in the summation impedance form so that both the three-phase and phase-to-neutral fault impedances will be on the same voltage basis which facilitates plotting of the impedance diagram on the study sheet.

The study sheet used contains a log-log graph on which are plotted the time-current characteristic of the various protective devices, Mr. Burch explained. Templets are used to plot the curves. The lower part of the study sheet has a space for an impedance diagram of the feeder being studied. The relationship between the feeder diagram and the time-current graph is such that a vertical projection from any point on the impedance diagram will indicate at its intersection with the current scale the fault current at this point; also, its intersections with the time-current curves will indicate the operating times for the protective devices for a particular kind of fault at this point.

Mr. Burch reported that although considerable time is required to prepare the templets for the various protective devices for use in plotting time current curves in the upper portion of the study sheet, this trouble is amply repaid by the ease and rapidity with which the application of various combinations of protective devices may be examined.

The feeder diagram and study sheet, if kept up to date, provide a reasonably complete picture of operating conditions on a feeder for a quick reference when investigating coordination or equipment failures.

Alex H. Pillsbury, City of Jacksonville, Fla., "An Elementary Approach to Distribution Relaying":

After describing the general practices of the Jacksonville Electrical Department with respect to distribution relaying, Mr. Pillsbury pointed out that their ground relays are set to pick up at approximately 160 amperes, with the lever setting normally on #1 position.

"Our normal ground relay pick-up setting may seem to some to be higher than one would speak about," Mr. Pillsbury said. "Some burn-down might be prevented, were this protection more sensitive. Our experience is that a lower setting contributes to greater number of outages by unnecessary tripping, due to load unbalance caused by single phase load installations, the loss of single phase fused laterals or the inherent unbalance characteristic of the circuit. This last is sometimes caused by a diversity in the load on a particular circuit, where unbalance shifts over the 24-hour period.

"All feeders in manually operated stations are logged hourly, and in unattended stations they are checked once a week. Spot checks and three-pen ammeters are employed when conditions appear to warrant. Unbalance of greater than 50 amps between phases is reported, so that transformers may be shifted to equalize conductor loading. Even with careful attention unbalances exist longer than desired. Available in-

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Complete line for ¼" to 4" pipe. 3 types cover all needs. Swinging top —easy to install.

GROUND RODS

Sectional or regular. Copper armored ***uniformly*** thick from end to end. Rigid steel core.

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Built-in connector clamp. For EMT or rigid conduit. No threads or fittings needed!

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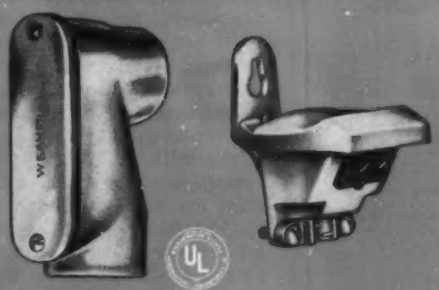

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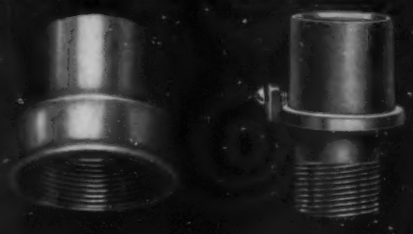
Eliminate use of makeshift plumbing fittings on mast type services for ranch homes.



Stock your shelves with sales—sell the complete WEAVER line! Write for catalog.

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formation would lead one to believe that 25% of phase relay values is what others aim at, but we try to be a little higher. There might be some burn-downs due to arcing grounds, but by the nature of them it would be impossible to determine the criteria where the effect of ground relay settings would be ideal.

"The coordination of fuses is not the problem in a compact 4 kv distribution system that it would be at a higher distribution voltage where feeders are of greater length and the area and load are far in excess of that of a 4 kv feeder. The coordination of fuses with relays always requires considerable care in fuse selection and relay setting. Reclosing on faults with successive relay trips may prevent proper fuse action. If fuses clear certain branches or laterals of considerable load, a sensitive ground relay action would clear the circuit. In an urban area where air conditioning is rapidly becoming prominent as a three-phase load together with commercial three-phase loads, the loss of a phase is not often desirable and perhaps it is best to clear the whole circuit with a good chance of immediate reclosing.

"The standard reclosing practice of the City of Jacksonville on 4 kv feeders is a three-shot action. The first reclosure is within two seconds; the limiting factor being the opening of the relay contact and the breaker timing in going through the opening and closing cycle. The second reclosure is at 10 seconds and the last at 35 seconds after the initial action. In manually operated stations, the operator tries the circuit one time in regular procedure. In cases of second tripping there is no fixed procedure and the judgment of the operating personnel holds."

The afternoon session devoted to industrial plant relaying, included four presentations. W. W. Pruitt, of J. E. Sirrine Corp., Greenville, S. C., discussed "The Coordination of Relays in Industrial Plants." He was followed on the program by H. B. Greear, General Electric Co., Atlanta, who talked on "Neutral Grounding of Industrial Systems and Its Affect on Relay Protection."

"The Grounding of Equipment for Safety to Personnel," was presented by A. C. Crymble, Tennessee Eastman Co., Kingsport, Tenn., and the concluding talk at this session was made by Jack Davey, Louisiana Power and Light Co., Algiers, La., whose subject was "Relaying of Tie Lines between Industrial and Utility Systems."

Stock purchase plan

(Continued from page 23)

The corporation is worth $100,000. Stock is increased to $200,000, the extra $100,000 held for purchase by the employees. If the corporation nets $50,000, the employees' share would be approximately $24,000 (49%) which, after individual taxes, would be $20,000. This would be used to purchase stock. My $26,000 (51%) would remain in the business. At the end of five years, on the above basis, the full stock purchase would be made, and the business worth $200,000. The amount I have left in the business is due and payable to me. Payment of this amount, $130,000, less yearly corporation tax on same, would bring the amount down to approximately $80,000, so arranged as not to hurt the business.

The corporation, in addition to the above, has covered each man with life insurance in the amount of final stock ownership, so that in the event of death, his stock may be purchased on the same basis by his replacement. Only in my case is my wife or estate permitted to retain stock in the corporation after my death, and this is optional. Further, each man is insured for absence due to accidents or sickness, effective after thirty days for 75% of his weekly salary with the right given the corporation to buy back his stock at book value, should he be unable to return to work after one year.

The agreement covers company liability for capriciousness or instability on the part of any of the employees, and with consent of four, he can be relieved of his position, with all of his stock bought back at purchase price. This clause protects all against each other.

Plan's success

As mentioned, the plan was to have run five years, but it is now expected to culminate this, the fourth year. It has brought most

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July, 1957

gratifying results. Full responsibility has been assumed by everyone and there has resulted a working-togetherness that was unknown before. Cliques and buck-passing are unknown, as each department polices the other.

Full proof of success is seen in the rise of sales and other services. Four years ago our sales were approximately $250,000, with steady increases to $450,000, $650,000, and $850,000 - - - this year promising to go over a million.

Today, I am more in an advisory capacity, a coordinator, rather than the big boss. I can plan for much-neglected vacations and see ahead to possible retirement, with the knowledge that the business will go on, taking care of key employees and myself, as well.

In summing up, if you are planning something along this line, remember that, even if you have worked hard to own your business, giving part of it away can pay dividends in remuneration and peace of mind.

Emergency service

(Continued from page 22)

advertisements in the local newspaper.

Emergency service offers an opportunity to talk to a customer about safe wiring at a moment when the subject is very much on his mind. Personal contact is understandably our most effective medium of promotion.

Typical calls

The following are typical jobs we have had:

We were called out on an emergency to an apartment house development where the renewal of burned-out feeders came to a $22 job. The next day the District electrical inspector condemned the overloaded system and we were summoned to heavy-up one of the mains, a job that came to about $600. We had cautioned the property owner that a recurrence might take place unless the system was brought up to standard. It was therefore natural for him to turn to us for further work.

One Sunday afternoon, recently, a local linen service had a short circuit. Many contractors had been called but none had the men to respond with. That emergency call which we took yielded a $6,300 rewiring job of the entire plant, a recommended must by the insur-

Inventory Control
Eliminate the many problems of inventory control by purchasing your Arro Anchoring and Drilling Devices as needed from your local industrial supplier, wholesale hardware, or electrical supply house.
Always Specify
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ARRO EXPANSION BOLT COMPANY

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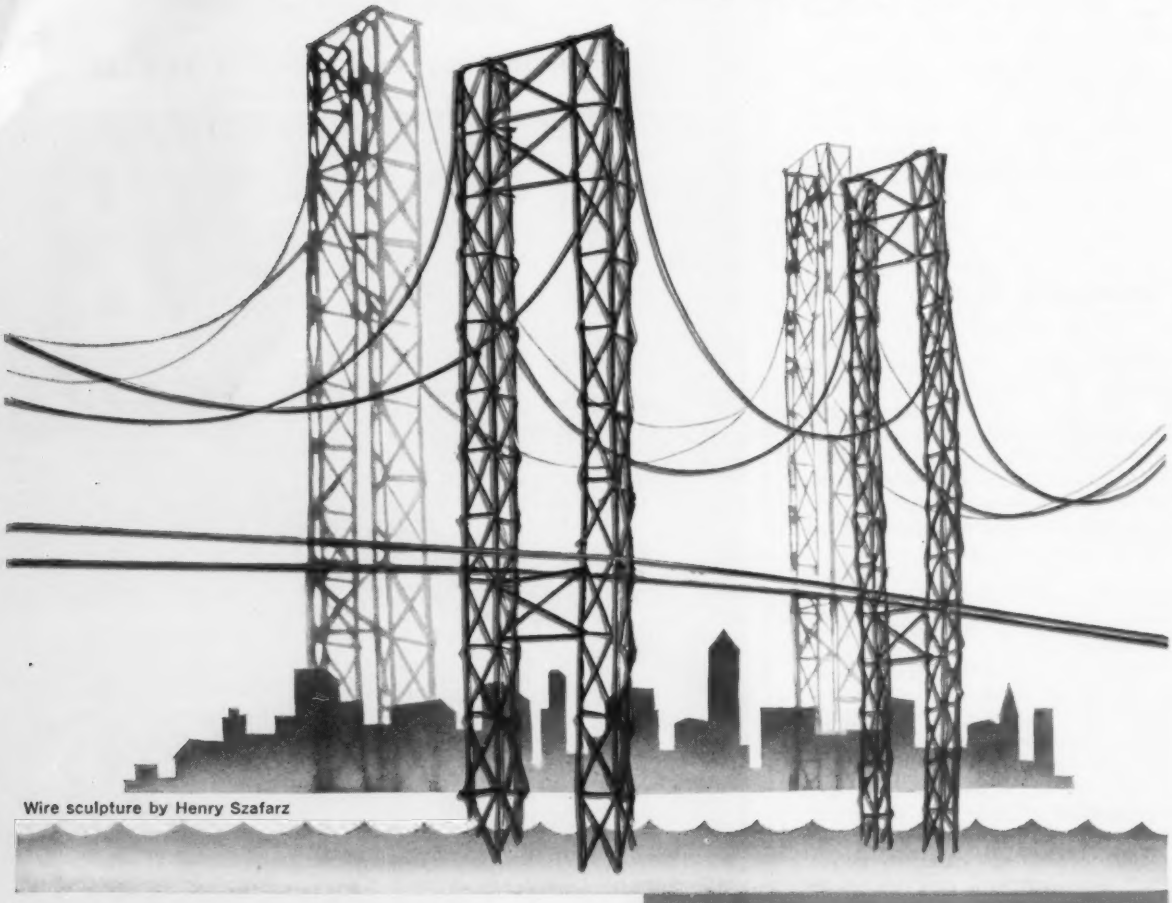
"Monument to Power"

Every engineered structure stands as a tribute to the men who planned and built it. And to the efficiency of their equipment, too.
Simplex-ANHYDREX cables, for instance, which are used everywhere for power distribution, control, floodlighting and numerous other functions. These expertly-engineered cables are equally suitable for overhead or in-the-ground use. They resist sunlight, ground acids, alkalies, oil, heat and flame, and their ANHYDREX insulation makes them super-resistant to water.

SIMPLEX WIRE & CABLE CO.,
79 Sidney Street, Cambridge 39, Mass.

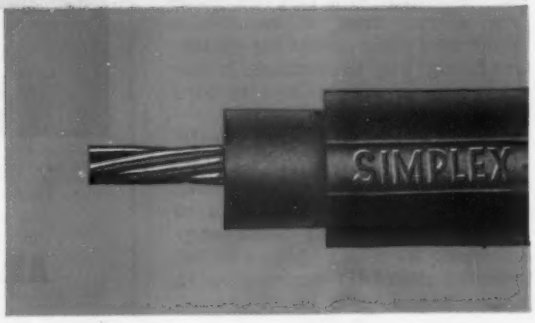


Wire sculpture by Henry Szafarz

Simplex

LIVE BETTER ELECTRICALLY

ANHYDREX



ance company. We removed all internal wiring, renewed conduits, putting our men to work at 8 p.m. until 4 a.m. without interruption of plant operation.

We had run temporary lines and no more time was lost than the few hours between Sunday afternoon and the usual hour of plant opening the following morning at 4:30 a.m.

In a large law firm where fire broke out one Sunday noon we had lights in by 7 p.m. that evening. A few days later we were given the order to go ahead with a complete wiring of the entire building, also supplying new fixtures.

Troubleshooting

To handle emergency service efficiently, journeymen electricians are trained by us in trouble shooting, even though they may have had wiring experience in new construction and remodeling.

Knowing where to check, where to look for trouble is of prime importance. Recognizing the symptoms reduces loss of time.

In training our mechanics on emergency jobs we tell them to pull all extension cords out of existing receptacles promptly, and disconnect all ceiling and wall fixtures. All switches must be closed. They next try the fuses to see whether a blowout occurs on a fuse. In case of fire, we disconnect all wires and run new lines for temporary lighting.

A mechanic observes several jobs before he is permitted to handle an emergency job under the eye of his supervisor. Five months of training follow before he is permitted to take charge of an emergency job entirely on his own.

We feel emergency work is an enormous field. True, it is operated on a risk basis. Another of its special problems is collecting. The rooming house emergency does not always yield cash payment on the spot. However, I would say that 25% of our total volume springs from the fountainhead of the emergency. Though time-and-a-half for labor and special truck calls run us into a 30% higher overhead, the satisfaction of emergency work cannot be gainsaid.

Street lighting

(Continued from page 21)

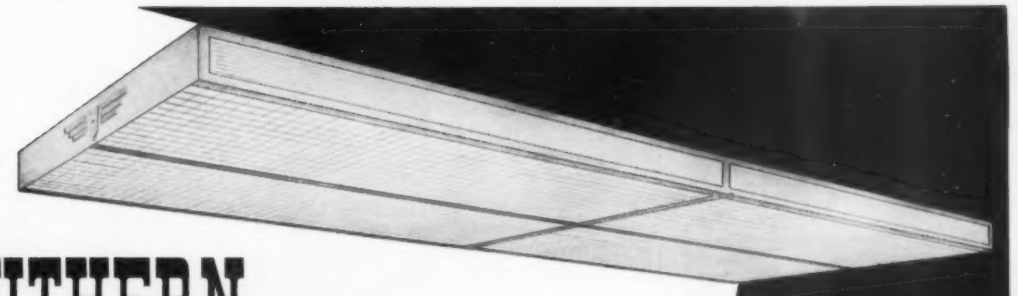
another $63,000. This phase of the program is still in progress."

Residential street lighting has also been keeping pace with the growth of Dallas. Approximately 600 of this type of light are being installed each year, according to Monk.

"These lights are placed as a result of petitions," he explains, "as our experience has shown this method to be the most satisfactory from several standpoints.

"In many cases, the sentiment among those most directly affected is against a street light at a proposed location, and, unless there is particular crime or traffic-hazard knowledge, such sentiment must be counted. Costly preliminary planning and construction can be avoided in many cases, if it is known beforehand what can be expected. In this connection, antagonism that naturally develops over arbitrary methods sometimes never occurs, if residents feel they are having a part in bringing about a community improvement.

"Until recently, it has been par-



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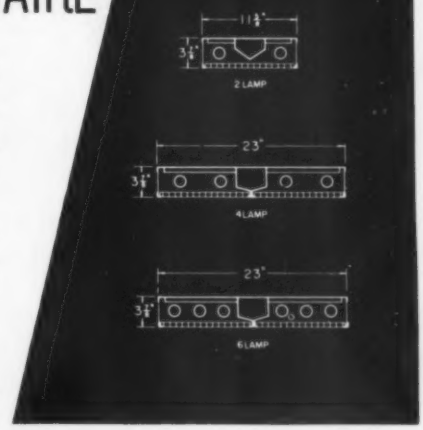
SHAL-O-LITE LUMINAIRE

This shallow luminaire may be used as an individual unit, in continuous rows, or arranged in various patterns. When surface mounted, the plastic side panels of ribbed, polished diffusing polystyrene illuminate the adjacent ceiling. The white translucent louver of molded 5/8" cubicles provides 42-degree shielding lengthwise and crosswise.

Available in two, four, or six lamp luminaries with Rapid start, Slimline, or starter type ballasts.

Remember, specify and satisfy with SOUTHERN fluorescent fixtures.



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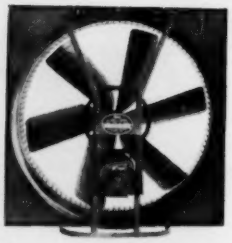

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ticularly difficult to secure cooperation toward the installation of mid-block street lights. Extension of an overhead wire supply pole line from one end of the block was necessary, and residents not living near the middle of the block and having house electric service from the rear usually protested vigorously the extension as unsightly.

Roadblocks to lighting

"Because of the controversy, particularly in newer sections with longer blocks, a plan was devised to permit wire extension between houses from alley to street to serve mid-block lights. This innovation has been of great benefit in bringing about acceptance of this much-needed type of street light."

Like all city planners, Monk finds it difficult to reconcile trees along streets and "good" lighting. He concedes that both are desirable. But he points out that trees near curbs with foliage over the sidewalks and streets create a barrier to illumination and nullify effectiveness of an expensive city service. It is especially true in the older parts of town where street illumination is needed most. The Dallas Park Department has been advocating the omission of trees from parkways and Monk says this helps in lighting the streets.

Residential street lighting in Dallas is, on the whole, ahead of the national average. As Monk explains:

"Our standard unit has always been 4,000 lumens as against approximately 2,500 lumens in the Southwest and elsewhere. More recently, other cities have become street-lighting conscious and are modernizing. Dallas is keeping step here, also. Last fall, a program got under way to replace fixtures in older parts of the system with new units. Until all the 3,500-odd open-type units are replaced, this program will go forward, requiring from five to seven years. With this replacement program, our street-lighting future will be slanted toward keeping pace with traffic way improvements and residential growth."

Improved downtown lighting

Since 1950, the annual street-lighting cost has risen from $140,000 to $320,000. The number of light units has been increased from 7,500 to 14,000, while the installation of a greater number of higher intensity units has raised total light output in the system from 35-million to 105-million lumens. The cost for 1,000 lumens per year has decreased from $4 to $3.

Dallas has been turning more to the use of fluorescent lighting in downtown areas. After the war, with increasing citizen demand for better downtown street lighting, Monk and his staff began looking for something to replace the old, filament-type lamps. At first, mercury vapor lamps were tried out, but not in any great number, because city planners got curious about a new development —fluorescent tubes for street lighting.

"Only two places we knew of," explains Monk, "had tried it out—London, England, and Oakwood, Ohio, a suburb of Dayton. The light of the mercury vapor lamp can be controlled—you have a small source and a prismatic globe. It's fine for keeping traffic moving. But the fluorescent, with scattered, diffused light, would illuminate pavements for heavy pedestrian traffic, and dress-up store fronts.

"We finally decided, in early 1955, on our pilot project—replacing 11 old filaments with five fluorescents, at a cost of $5,000. We picked a block on Main Street, from Stone to Ervay. And we just got one light up when the public began calling. We knew we were on the right track. We had 60 per cent more light and complete public approval."

The city has spent $220,000 and has just about completed the first phase of its fluorescent program.

Meanwhile, mercury vapor lights have been strung along recently widened median-strip streets, where their most direct, downward beams help grateful motorists.

Accident rate falls

A dramatic example of how improved lighting apparently has helped is cited by Monk. The State of Texas widened and improved a state highway in South Dallas. Several new bridges were built. Conventional lighting from the sides was retained. Then, a series of bad traffic accidents happened within several months after the street work was finished. There seemed to be no specific reason. Several traffic experts suggested that the highway improvements had led to faster speeds by motorists. Because of poor street illumi-

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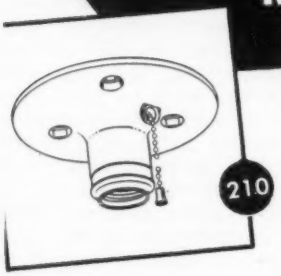

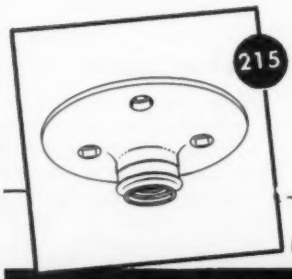

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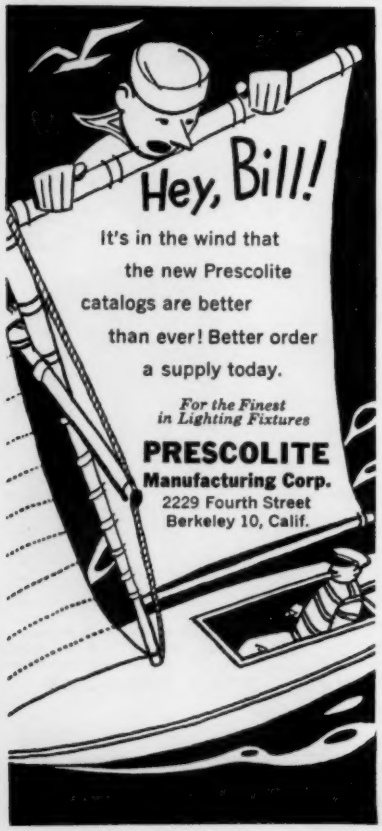


nation for faster traffic, several accidents occurred when automobiles struck bridge abutments. Monk's department called for better lighting along that particular stretch inside the city. Immediately, traffic accidents declined. He concludes that mercury vapor lamps with higher intensity beams, especially at bridges and approaches, helped drivers spot the hazards.

The accelerated street-lighting program over the recent years has had a noticeable effect on the city's night appearance, particularly to those viewing Dallas from the air.

NECA meeting

(Continued from page 34)

glamorous innovations here and there, a huge electrical modernization market remains. Eighty-five per cent of today's retail stores need improved lighting. Another 40% need air conditioning. If only one out of ten of these undergo some kind of renovation each year, it could mean an additional 500,000 kw of load—and one out of ten can be traditionally expected. A little mental arithmetic can translate this into dollars and cents for the wiring and service equipment people. But why stop with one out of ten?

"Another big segment of the market is the air conditioning of modern office buildings. In one office building in Detroit, over 2,500 individual air conditioning units have been added in the last few years. Of course, this led to rewiring the entire building. Another one of our largest and finest buildings has been rewired three times in the 25 years it's been built. Wiring in commercial buildings should actually provide for air conditioning whether or not it's installed. Requirements can be well estimated and normally won't change over the years.

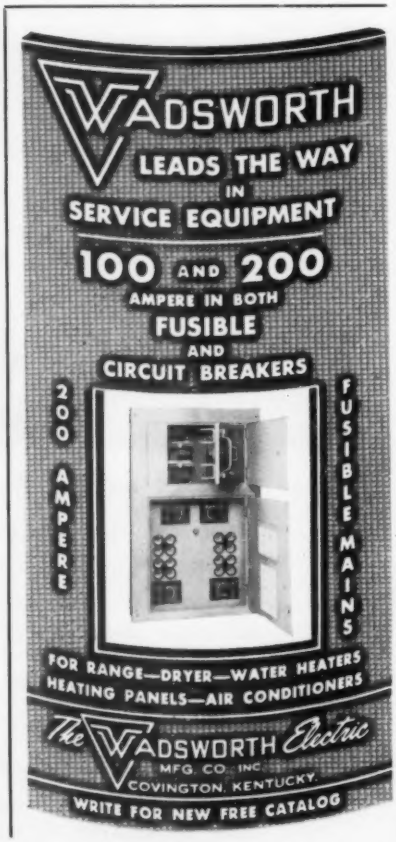
Trend to town living

"A rather surprising trend has begun in the last few years and is expected to gain momentum in the future. Sociologists call it the 'Back to Town Movement.' Many people who some years ago moved to the suburbs and whose families have now grown up and gone are coming back to the city apartment building. They have become accustomed to the convenience and comfort of electric living in their suburban homes and are demanding something similar in the apartments. Builders and architects are beginning to recognize this trend and provide for it," said Hart.

Apartment houses are lucrative markets. People are demanding more and more electrical conveniences such as electric cooking, air conditioning, automatic washers, large screen television, electric dryers and vastly improved lighting. As they do, it becomes necessary to rewire entire buildings to accommodate increased electrical loads. An excellent example of this trend can be found in New York City where, in Consolidated Edison's three-year wiring modernization program a total of 402 apartment buildings have been rewired for modern electric living, he said.

School lighting

"It follows that perhaps our fastest growing modernization market is schools. A large portion of school classrooms today are lighted to low and obsolete standards. Prompted partly by the example set by some new school buildings and partly by the feel-



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ing that nothing's too good for the kids, parents are complaining about this situation. More than that, they have been willing to put up the tax money to support their demands and are forcing city and school officials to do something about it.

"In contrast to the 12-footcandle lighting level found in old schools, today's minimum standard is 35 footcandles. Some school administrators are thinking in terms of 50 to 100. Electric heat is also gaining in popularity for school buildings because of the relatively low investment and maintenance cost, and the fact that it does not require additional space in the building. Other uses are television and home economics equipment.

"Since 1946, over one billion square feet of school construction has been completed. At this rate, it is not unreasonable to expect a dollars and cents market for electrical wiring and equipment in 1957 of $150-millon for school construction alone. School modernization or new construction represents the expenditure of public money. Administrators must be made to realize future electrical requirements. They should ask themselves, "Will the wiring going in today still be enough for 1967?"

"I think you'll agree that the opportunity for commercial and institutional sales promotion is great, even if based simply on known market potential for modernization of existing structures. And I think you'll agree that our optimism about future applications is well-founded. Finally, if you agree that a potential market of over 30 billion dollars in the next ten years can be attractive to the electrical wiring industry, then you must share my confidence that these sales opportunities are worth doing something about.

Industry's route

"Broadly speaking, industry action must take three forms: (1) customer recognition, (2) grass roots action, and (3) industry cooperation.

"First, the customer must be educated to recognize his wiring problem in forms of gain or loss of benefits and profit to him. Second, to gain this recognition and translate into rewirings, strong local level support. Third, the enlistment of and full support to all allied programs aimed at our own mutual objective.

"May I suggest the manual, "Commercial Wiring Modernization," prepared by the Wiring Specifications Committee of the Edison Electric Institute, to arouse customer-interest in commercial wiring modernization. It is intended for use by store owners, architects, engineers, contractors, and utility people. It will help them to appreciate the need for expanded wiring facilities in older buildings.

"To be effective, this booklet will require selective distribution tied-in with imaginative local programming like Housepower. The key to success in the commercial wiring market will be strong local action programs.

"Another useful tool is the National Adequate Wiring Bureau's new plan book 'Let's Talk Business.' It will serve as an action guide for all branches of the electrical industry participating at the local level. It contains ideas you may want to use or adapt to your needs, such as market information, suggestions for local activities, and thumbnail sketches of successful commercial wiring sales approaches.

"Keystone of the bureau's program will be a series of power rating sheets. This, a Drugstore Powerating sheet, will be the first of a series which eventually will cover every type of commercial and institutional occupancy.

"In a manner similar to the Housepower Rating Sheet for homes, the use, convenience, and increased profits resulting from wiring improvements can be effectively presented to customers.

"Again I'd like to emphasize that commercial sales opportunities are worth doing something about—and wiring modernization will and must lead the way.

"Now what are we going to do about it? What is NECA going to do about it? Right now there is being developed a completely practical sales training course to train contractors and their personnel on how to really develop and sell this market. This will be a course developed by sales training experts working closely with groups of electrical contractors who have successfully sold this market.

"You will be hearing more and more about this course. It will help you to ring the bell on that large and healthy cash register," concluded Hart.

Training available

Kenneth Maddox then announced that NECA's training department would soon make avail-

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able to interested members complete courses in selling plant modernization to industry, basic design and layout for lighting installation, and machine bookkeeping systems (accounting, cost analysis, etc.).

Mr. Moseley spoke briefly on activation of new chapters for line construction contractors, indicating that an intensive membership drive among existing non-members would shortly be launched.

The final day's program was devoted almost entirely to summing up NECA activities.

Addressing members briefly on NECA apprenticeship training, Mr. Damon stated that the present manpower shortage in the electrical contracting field could be virtually solved by improving present training methods, coupled with follow-through courses for journeymen.

"There's altogether too much time-loss on existing jobs because so-called experienced journeymen too frequently are in the dark about what job to tackle next on completing another job."

"It's amazing to realize that 130,000 productive hours could be added to the nation's present work schedule by adequately training our existing supply of journeymen. And this training must be done at the local level, not from Washington," he concluded.

Vast field services

Mr. Geary was then called on to discuss NECA field services, and he stated that there were presently 3,727 NECA members in 112 chapters. The association, he added, has assets of $600,000, and a 1957 budget amounting to $900,000.

He stated that NECA activities, though legion, are, for simplicity's sake, placed in five major departments: public relations, market service, labor relations, technical and training, and field service (which helps to keep the other four activities in operation throughout the nation).

"Our major objective these days is to get our members to use our services to their full extent . . . to take advantage of these things which they pay for and which are at their fingertips."

The meeting was then open for floor discussion, and major interest of those present for the moment was on union pension plans and other aspects connected with the International Brotherhood of Electrical Workers.

Chairman K. D. White of the Third District Resolutions Committee was recognized. He called for official adoption of four resolutions: (1) Expressing confidence in the national NECA office and staff; (2) commending Third District and Virginia Chapter officers for the excellent meeting; (3) commending the executives and staff of the Roanoke Hotel for the hospitality extended all NECA members and wives; and (4) memorializing the late Deronda Levy of the Levy-Morton Electric Co., Columbus, Ga.

Discussion was then conducted by Vice-President Teal relative to selection of a site for the 1958 meeting. A telegram was received from the South Florida Chapter inviting the group to meet in Miami. The site was officially selected and the meeting then adjourned.

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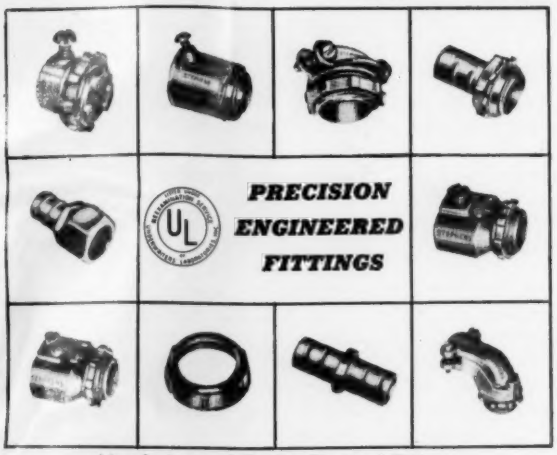

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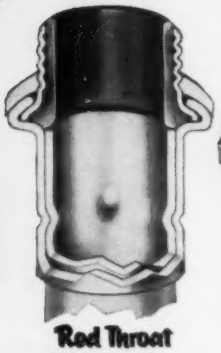

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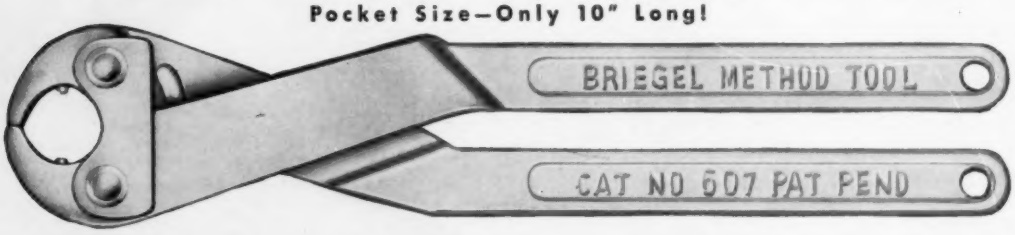

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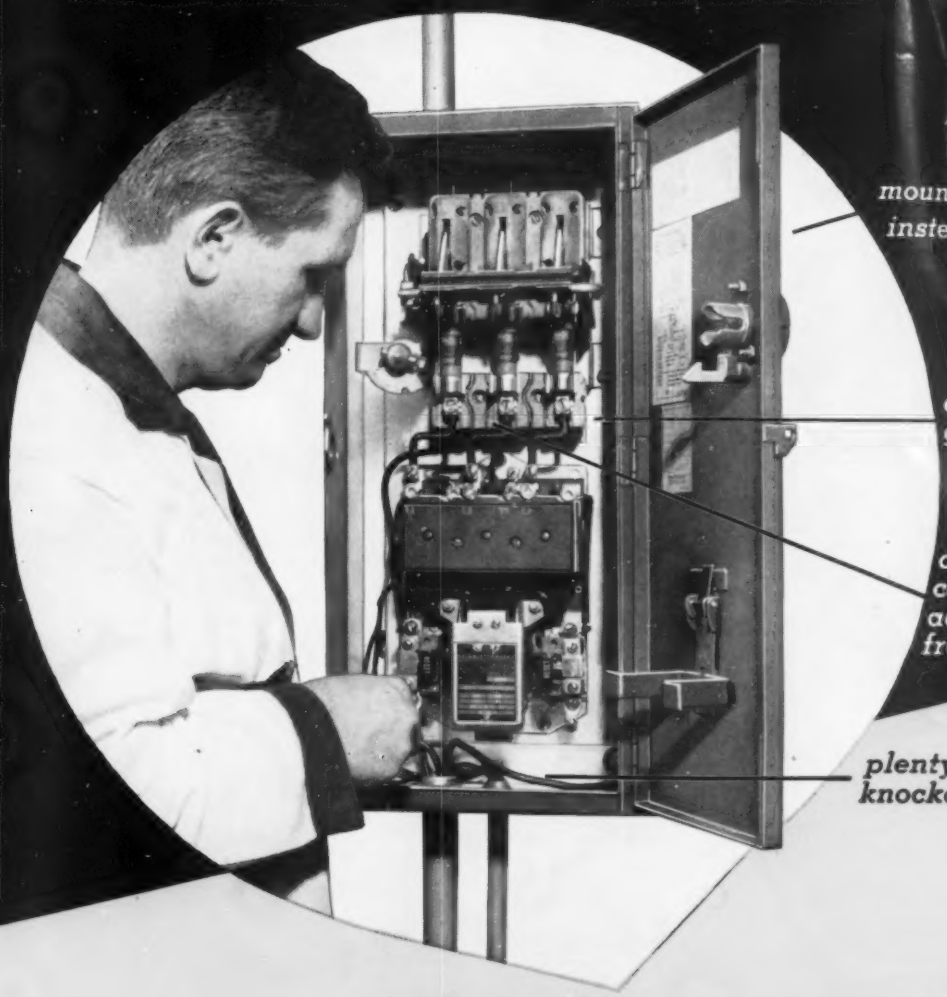

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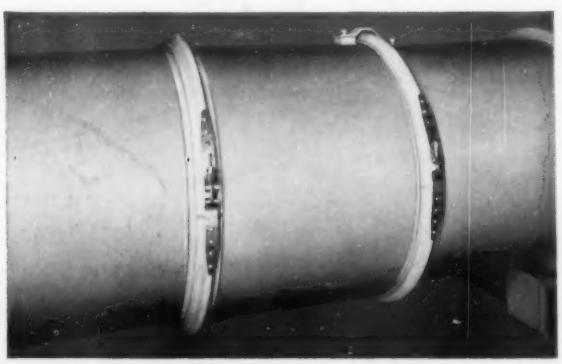

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